NETWORK WORLD

The Newsweekly of User Networking Strategies

Volume 8, Number 26 An International Data Group Publication July 1, 1991

Novell drafts blueprint for LAN control

By Caryn Gillooly
Senior Editor

NEW YORK — As expected, Novell, Inc. last week detailed at PC Expo a wide-ranging network management strategy for monitoring and controlling NetWare LANs locally or from a central data center.

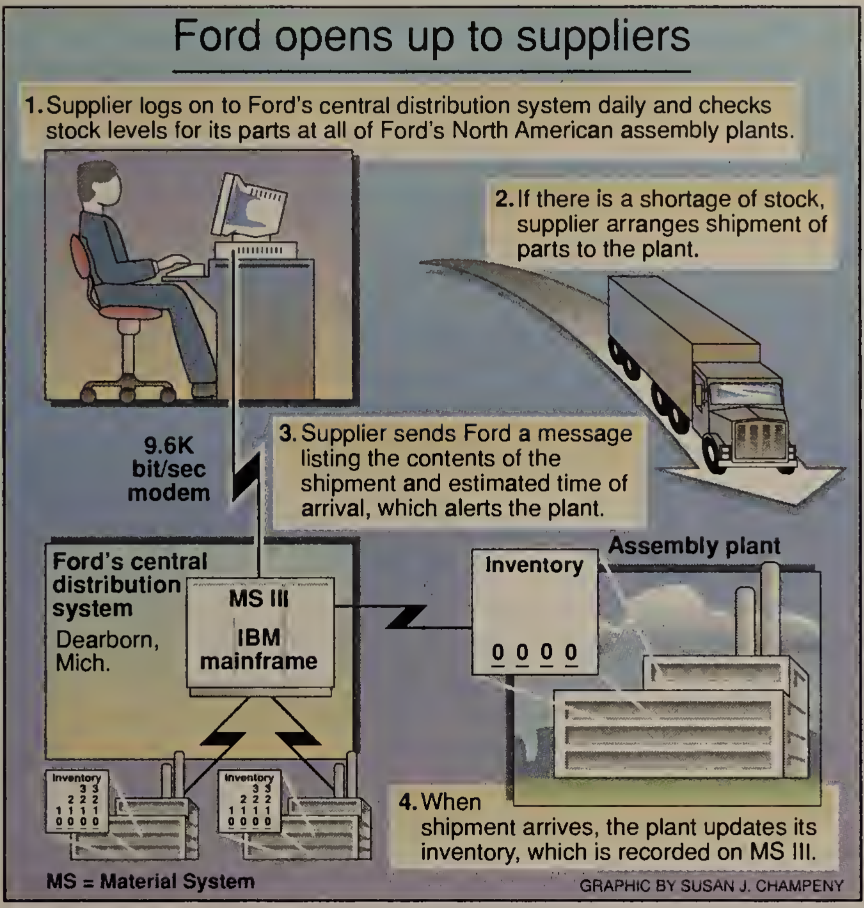
Although Novell did not announce equipment supporting the strategy, it said the as yet unnamed net control plan will be implemented in product during the next two years.

The vendor also made it clear that only NetWare 3.X local-area networks will be supported under the management plan. Users with older NetWare versions must use existing monitoring tools or upgrade to the newer net operating system.

Novell said its distributed management strategy will enable users at a central console to control remote devices as well as cull performance and alarm data from software agents and net management applications across a network.

The console, in turn, will be capable of managing the various NetWare LANs or acting as an element manager and routing data to integrated network manage-

(continued on page 50)



Ford opens up to suppliers
1. Supplier logs on to Ford's central distribution system daily and checks stock levels for its parts at all of Ford's North American assembly plants.
2. If there is a shortage of stock, supplier arranges shipment of parts to the plant.
3. Supplier sends Ford a message listing the contents of the shipment and estimated time of arrival, which alerts the plant.
4. When shipment arrives, the plant updates its inventory, which is recorded on MS III.
9.6K bit/sec modem
Ford's central distribution system
Dearborn, Mich.
MS III
IBM mainframe
Assembly plant
Inventory
0 0 0 0
Inventory
MS = Material System

GRAPHIC BY SUSAN J. CHAMPENY

Ford profits by letting suppliers tap into systems

By Wayne Eckerson
Senior Editor

DEARBORN, Mich. — Ford Motor Co. has become the first automaker to open up its internal inventory systems to suppliers, a move that has greatly improved supplier relations and increased the efficiency of Ford's just-in-time manufacturing operations.

The Direct Data Link (DDL) program, which began in February after a successful six-month pilot, gives suppliers direct access to Material System (MS) III, Ford's inventory control system running on an IBM mainframe at its headquarters here.

DDL provides suppliers with up-to-the-minute status information about stock levels and shipments in transit for each Ford plant. That data is critical in a just-in-time environment where inventory levels are kept razor

(continued on page 49)

Lotus deal expands IBM's office vision

IBM teams up with Lotus for groupware, E-mail, plans to weave Notes, cc:Mail features into OS/2.

By Paul Desmond
Senior Editor

NEW YORK — IBM last week expanded its suite of office automation products for local-area networks by announcing it will market Lotus Development Corp.'s Notes and cc:Mail software and will work with Lotus to weave features of both products into the next version of OS/2.

The agreement adds groupware software to IBM's office automation line, a technology IBM admitted it had no plans to develop on its own. The IBM-Lotus relationship could be a boon to Notes, giving the product the credibility that comes with IBM's backing, as well as to OS/2, which IBM has promised to significantly enhance using Lotus technology.

IBM fills in the gaps with network vendor alliances, see page 4.

The two companies pledged to integrate electronic mail and directory functions into OS/2 Version 2, along with some Notes communications and data base functions. Such a move will give application developers a common set of network and data base management capabilities they can easily invoke from any OS/2-based application.

The announcement of the Lotus agreement overshadowed IBM's promised update on the status of its OfficeVision/2 LAN, which was not included as part of

(continued on page 51)

INSIDE

Managing deployment of the largest ever tactical network, page 19.

CCS7 woes fuel outages for 2 telcos

By Anita Taff and Bob Wallace
Network World Staff

Two regional Bell holding companies — Bell Atlantic Corp. and Pacific Telesis Group — last Wednesday suffered serious network outages that stemmed from problems in their Common Channel Signaling System 7 (CCS7) nets.

Bell Atlantic suffered the more dramatic of the two outages when service was disrupted for as long as nine hours for some five million users. About three million customers of Pacific Telesis' Pacific Bell unit lost service for three hours.

In the aftermath, users and analysts voiced concern about the growing vulnerability of the public network, which is becoming increasingly dependent on sophisticated systems such as CCS7. The incidents bring to three the

(continued on page 7)

NETLINE

▲▲▲

ONE MAN'S CRUSADE for a LAN internetwork pays off at a California agency. Page 4.

USERS APPLAUD ADOPTION of X.435 standard but say deployment of EDI over X.400 is still two years away. Page 4.

NIST PROPOSES federal digital signature algorithm, but opponents question wisdom of agency's choice. Page 4.

MULTIVENDOR USER GROUP formed; nine charter users and 18 charter vendors named. Page 5.

LAWMAKERS GET MIXED feedback on bill to allow RBHCs into the cable TV arena. Page 6.

VIDEOCONFERENCING continues to attract users despite deficiencies of international standards. Page 29.

NEWSPAPER

FEATURE

▲▲▲

Network World, Bell Labs test routers' SNMP agents

By Edwin Mier
Special to Network World

SNMP Test Series

If ever there were a technology that has rocketed into user attention, it is the Simple Network Management Protocol (SNMP).

But even though SNMP is hot, it should be looked at critically. That's where the *Network World*/AT&T Bell Laboratories SNMP Test Series comes in.

In this, the second article in a series on the technology, we evaluate the SNMP capabilities of nine leading routers.

Response to the first article, which examined SNMP on bridges, indicates that interest in our SNMP tests is high. In fact, more than 175 readers called in asking for additional test details and performance data.

We believe that this test series serves an important user need. The information in this and other articles in the se-

(continued on page 33)

DEC breaks into token-ring mart via Proteon venture

Separate deal with InterConnections helps link PathWorks to devices on other vendors' LANs.

By Eric Smalley
Senior Editor

NEW YORK — As expected, Digital Equipment Corp. last week announced agreements here at PC Expo with Proteon, Inc. and InterConnections, Inc. to extend its PathWorks local-area networking offerings to token-ring networks and to link PathWorks to network operating systems from other vendors.

DEC and Proteon signed a three-year, worldwide agreement under which DEC will resell Proteon's line of token-ring adapter cards, bridging routers, intelligent wiring hubs and network management software. Specific products and pricing are not scheduled to be announced until this fall.

The deal with Proteon covers joint marketing, sales, service and support, and forms a relationship that DEC intends to expand, according to Gail Daniels, DEC's director of networks marketing.

DEC also rolled out the DEC TRNcontroller 100, a token-ring adapter card that enables VAX 4000 and MicroVAX 3000 series minicomputers to attach to token-ring LANs. The Q-bus card, developed in cooperation with Simpact Associates, Inc. of San Diego, allows the VAX systems to participate on a token ring as full

(continued on page 6)

MCI users to form group to influence carrier's moves

Top users to offer frank advice on service issues.

By Bob Brown
Senior Editor

WASHINGTON, D.C. — MCI Communications Corp.'s largest business customers are uniting to form the carrier's first formal user group, *Network World* has learned.

The MCI Users Network is scheduled to hold its first conference, titled "Partnerships for Success," in Dallas on Sept. 19-20.

A steering committee, which includes representatives from 12 of MCI's largest customers, has met twice to plot out the group's mission and will meet again next month in Richardson, Texas. Firms represented on the steering committee include American Express Co., SunTrust Service Corp. and Woolworth Corp.

For the Dallas meeting, invitations have been sent to telecommunications executives at MCI's 100 largest accounts. More customers are expected to be involved in the future, according to steering committee members.

"I can hardly wait for the first conference to start," said William Johnson, director of telecommunications at Woolworth and a member of the steering commit-

(continued on page 50)

Years of planning pay off in Equifax's net strategy

By Bob Wallace
Senior Editor

ATLANTA — After years of developing and modifying a comprehensive network strategy designed to meet its changing business needs, Equifax, Inc. last week issued a request for proposal for an enterprisewide custom voice/data network.

The RFP is the culmination of exhaustive network analysis, redesign and proposal evaluation in which the company rejected custom network bids from long-haul carriers, including two AT&T Tariff 12 proposals.

The credit data firm seeks a single, high-speed digital network that will enable it to implement videoconferencing to streamline internal communications and help its credit card company customers make faster and better decisions.

But a single network seemed to be a distant promise in the late 1980s when Equifax was broken into separate business units that operated 14 different networks in the U.S. and Canada.

"Each independent business unit had its own network and its own network management staff," said John Kies, Equifax's senior consultant of telecommunications management. "But we've since consolidated the staffs and are now looking to do

(continued on page 6)

Briefs

L.A. quake causes little damage. On the heels of a network outage last week that affected millions of users in the Los Angeles area, Pacific Bell had to contend with an earthquake Friday that registered 6.0 on the Richter scale. The earthquake hit Pasadena, Calif., a suburb of Los Angeles, knocking out electricity but causing no major damage to the telephone network.

"We are experiencing slow dial tone related to [high-traffic] volumes in the Pasadena area," a Pacific Bell spokeswoman said. The earlier outage occurred last Wednesday and affected about three million lines in the 213, 805 and 818 area codes.

Canada cuts off int'l bypass. In a move that outlaws a method of slashing Canadian calling charges, Canada's chief regulatory agency, the Canadian Radio-television and Telecommunications Commission (CRTC), last week adopted a rule that requires Canadian carriers to prohibit international bypass.

Users can currently slash long-distance phone bills by routing traffic from Canada, through U.S. private nets and back to Canada. This is possible because U.S. carrier prices can be as much as 50% below Canadian carrier rates. The CRTC said it prohibited this bypass to protect Canadian carriers. But observers say the restriction may be impossible to enforce.

Newbridge lands Unitel deal. Newbridge Networks, Inc. last week announced a contract with Unitel Communications, Inc., a Canadian carrier, for T-1 and T-3 multiplexers, as well as network management equipment. Under the contract, which runs for two years with an option for a third, Newbridge will supply its 3645 and 3600 MainStreet Bandwidth Manager multiplexers plus the 4600 MainStreet family of network management products.

The Newbridge multiplexers will be used to replace Amdahl Corp. equipment. Although no dollar amount was disclosed for the contract, Newbridge said Unitel has been buying more than $4 million worth of Amdahl equipment annually for the past five years. Unitel operates a nationwide fiber-optic and microwave-based digital network over which it offers private-line services. It is seeking licenses that will enable it to provide switched services.

IBM sows new partnerships. IBM last week announced its first SystemView development partners. The partners are Bachman Information Systems, Inc. of Burlington, Mass., Candle Corp. of Los Angeles, Goal Systems International, Inc. of Columbus, Ohio, and Platinum Technology, Inc. of Lombard, Ill. As IBM development partners, each of the firms will participate in SystemView design councils with IBM and users.

Also last week, IBM announced it has extended its relationship with Borland International, Inc. of Scotts Valley, Calif., for marketing rights to Borland's ObjectVision object-oriented application development tools. The new agreement gives IBM nonexclusive marketing rights to the new version of ObjectVision that works with OS/2 2.0, the 32-bit version of OS/2 due out later this year.

IBM lands Calif. DMV LAN deal. The State of California Department of Motor Vehicles (DMV) last week said it has awarded IBM a $1.7 million contract for installation of personal computers and local-area networks in its offices statewide. Despite its recent alliance with Novell, Inc., IBM will supply the user with a customized version of its LAN Server program to meet the bid's specifications.

IBM was the only vendor that entered bids for the contract. IBM submitted two proposals that called for LAN Server running on different hardware configurations. Under the contract, IBM will provide only products, and the DMV will handle integration of the LANs.

All in a day's work. A former General Dynamics Corp. computer programmer was arrested last week on charges of attempted computer fraud and computer tampering when he allegedly planted a logic bomb that could have wiped out irreplaceable data in a space missile project.

Michael Lauffenburger allegedly believed the company undervalued his work, so he planned to quit his job and then get hired back as a high-priced consultant to reconstruct the lost data caused by the renegade program he planted. A coworker stumbled upon the program and was able to disable it before it could cause any damage.

CONTENTS

Industry Update

Frame relay, SMDS drawing battle lines. **9**
MFS joins alternative access carrier trade organization. **9**

Telecommunications

FCC progress slowed by portable 800 issue. **11**
MCI offers association unique calling card plan. **11**

Data Communications

OSI limitations may ground airline net. **13**
IBM bolsters line of X.25 offerings for PS/2s, FEPs. **13**

Local Networking

Mac network surge boosted by Ethernet. **15**
Enhanced TCP/IP packs get support for Windows, SMTP. **15**

Management Strategies

How U.S. won net war in the desert. **19**
Users struggle to develop new network applications. **19**

International

Swedish firm plans packet net launch. **21**

Products & Services

Clearpoint multiport bridge card debuts. **23**

Opinions

Is X.435 the EDI interconnection solution? **24**
On the net manager's role as guardian of privacy. **25**
Action Center **40**
Networking Marketplace **46**
Networking Careers **47**
Resource Directory **48**

NW Bulletin Board. Contact us electronically. Our BBS lets you submit letters to the editor, pass on tips, leave change of address requests, interact with other readers, download free software and hunt for jobs.

Use your IBM, Apple or other microcomputer to reach the BBS at 300 to 2,400 bit/sec (8N1) by dialing (508) 620-1160 or at speeds up to 9.6K bit/sec by dialing (508) 620-1178. You can speak to us directly by calling (800) 622-1108.

Article reprints (minimum 500 copies) can be obtained from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172; (508) 875-6400.

digital

It's been six years now since Digital invented the first LAT terminal server. And after connecting more than 3 million terminals, PCs and printers with everything from Digital mini-computers to IBM mainframes, first is where we've stayed.

And with constant innovations, like industry-leading protocols for terminal-host connectivity, true

The toughest test is the test of time.

3270 connectivity and Dual Session presentation on a single screen, we plan on being first for a long time to come.

So get the terminal server that's outsold all others year after year, call 1-800-343-4040, ext. 222. Or contact your local Digital distributor.

TELNET NOW STANDARD
ON ALL DECserver 300's.

Digital
has
it
now.

©Digital Equipment Corporation, 1991. The DIGITAL Logo, LAT and Digital has it now are trademarks of Digital Equipment Corporation. IBM is a trademark of International Business Machines Corporation.

IBM gets more aggressive with network partnerships

By Bob Brown
Senior Editor

During the past six months, IBM has become increasingly aggressive in forging alliances with leading network vendors in an effort to keep pace in a rapidly changing market and maintain account control, analysts said last week.

Recognizing that even a company of its size and resources cannot meet all user needs by itself, IBM has established strong ties with key suppliers to fill gaps in its local-area network, network management and electronic messaging lines, among others.

The agreements are crucial for IBM's control of large accounts and may even keep important net vendors from working with IBM's rivals, observers said.

Last week, IBM announced several new partnerships. Under an agreement with Lotus Development Corp., IBM will resell Lotus' Notes groupware and cc:Mail, a LAN-based messaging package (see "Lotus deal expands IBM's office vision," page 1).

Separately, IBM named Bachman Information Systems, Inc., Candle Corp., Goal Systems International, Inc. and Platinum Technology, Inc. as SystemView development partners.

Those announcements come in the wake of a string of alliances formed during the first six months of this year. Among them were an agreement with Novell, Inc. under which IBM is reselling Novell's NetWare and a deal with AT&T under which NetView and Accumaster Integrator will be linked (see graphic, this page).

"IBM has recognized that it can't be all things to all people," said Frank Dzubeck, president and chief executive officer of Communications Network Architects, Inc., a Washington, D.C. consulting firm. "[IBM] has made it clear that if it's not in its best interest to develop something, it is going to form an alliance and save the development expense."

Daniel Warmenhoven, chairman and CEO at Network Equipment Technologies, Inc. (NET), which has a joint marketing and product development deal with IBM, agreed.

"IBM's come to the realization that the origin of good ideas is not solely contained within the walls of Big Blue," he said.

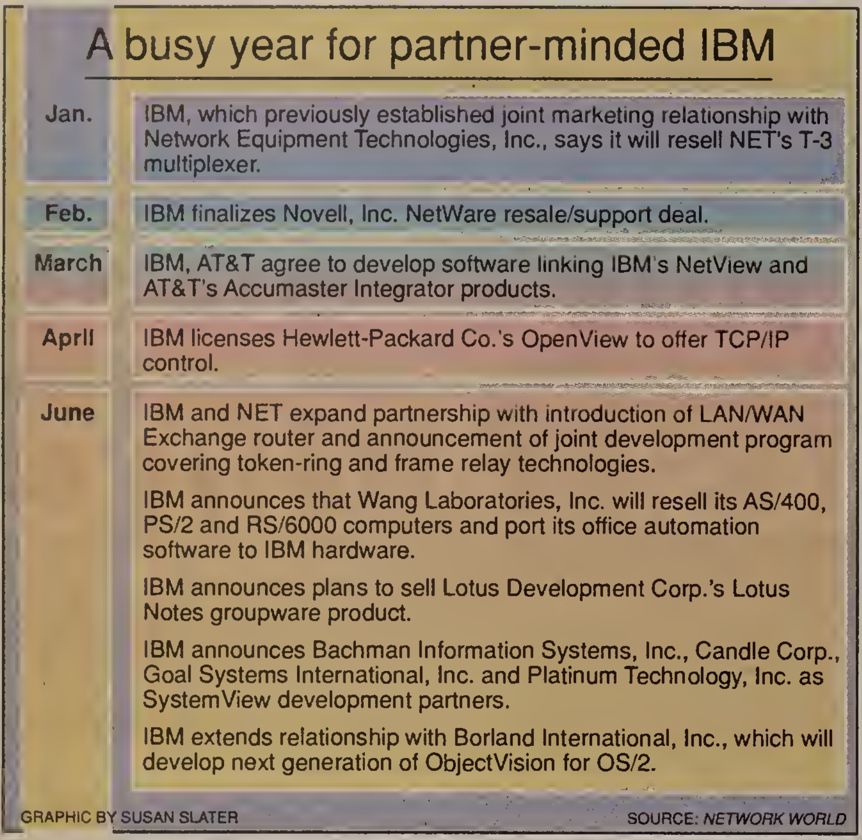
IBM officials were not available for comment on the strategy behind the announcements.

IBM evolution

IBM's partnership strategy has been evolving during the past few years. The company's relationship with NET is now 4 years old, though it has been revised in that time. IBM invested in a number of small software companies in 1990, and other alliances have been formed over the years.

But according to Dzubeck, IBM's push for partnerships with top network equipment and soft-

(continued on page 51)



A busy year for partner-minded IBM

Jan.	IBM, which previously established joint marketing relationship with Network Equipment Technologies, Inc., says it will resell NET's T-3 multiplexer.
Feb.	IBM finalizes Novell, Inc. NetWare resale/support deal.
March	IBM, AT&T agree to develop software linking IBM's NetView and AT&T's Accumaster Integrator products.
April	IBM licenses Hewlett-Packard Co.'s OpenView to offer TCP/IP control.
June	IBM and NET expand partnership with introduction of LAN/WAN Exchange router and announcement of joint development program covering token-ring and frame relay technologies. IBM announces that Wang Laboratories, Inc. will resell its AS/400, PS/2 and RS/6000 computers and port its office automation software to IBM hardware. IBM announces plans to sell Lotus Development Corp.'s Lotus Notes groupware product. IBM announces Bachman Information Systems, Inc., Candle Corp., Goal Systems International, Inc. and Platinum Technology, Inc. as SystemView development partners. IBM extends relationship with Borland International, Inc., which will develop next generation of ObjectVision for OS/2.

GRAPHIC BY SUSAN SLATER SOURCE: *NETWORK WORLD*

Users applaud passage of EDI-over-X.400 standard

But X.435 deployment two years away for most.

By Wayne Eckerson
Senior Editor

The recent passage of the CCITT X.435 standard for sending EDI documents over X.400 networks is good news for users, but even the most technically sophisticated companies don't expect to implement the standard in production environments for another two years.

Vendors are now hammering out an agreement specifying how they will implement X.435, a process expected to be completed by year end. It will then take another six to nine months to develop and test software based on X.435, users estimate.

"We are eager to implement X.435 when it becomes available, but we don't expect that to happen until 1993," said Mark Payne, worldwide electronic data interchange deployment manager for Texas Instruments, Inc. in Plano, Texas.

For large companies like TI, it will be well worth the wait.

The X.435 standard will enable users to combine their messaging and EDI networks, which will reduce administrative overhead and costs, and simplify net management. In addition, X.435 contains enhanced security, tracking and audit features. The standard will also make it easier for companies to send compound documents via EDI.

Many firms have experimented using X.400 messaging protocols, dubbed P2 and P0, to support EDI transmissions. While the protocols allow users to send EDI documents across X.400 networks, they have severe limitations.

The P2 interpersonal messaging protocol, which has been widely used in Europe to support EDI over X.400 and by international value-added network providers, requires EDI messages to be translated into ASCII, according to Paul Schachter, systems analyst at Boeing Computer Services Co. in Bellevue, Wash. It also requires users to write separate programs to route EDI mes-

(continued on page 50)

We want to hear from you. *Network World* has set up a toll-free number you can use to leave news tips or letters to the editor.

Let us know what's going on or how you feel about the stories you read in our publication. Call (800) 622-1108 and ask for Ext. 487.

NIST proposes standard for electronic signatures

Move criticized by some as ignoring tried and true.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The National Institute of Standards and Technology (NIST) last week proposed a federal standard for an algorithm used to create digital signatures in electronic messages.

The algorithm, which was created by NIST and the National Security Agency (NSA), was derived from the ElGamal signature technique now in the public domain.

But industry critics called NIST's choice inferior to a public-key algorithm already offered by RSA Data Security, Inc. and added that the new standard could lead to interoperability problems as it is incompatible with the widely accepted RSA version.

Public-key digital signature methods allow users to add their own encrypted signature or seal to an encrypted or clear text message, providing authentication for transmitted messages. In electronic data interchange applications, for example, users can sign purchase orders using their digital signatures.

Using public-key systems

With public-key signature cryptosystems, each user has a public key as well as a private one. Digital signatures distill the uniqueness of a program, file or data into a compact digital representation. The user then encrypts that representation with the private key and sends the message.

The signature is decrypted on the receiving end using the signer's public key. If the signer's identity has been verified, the decryption was successful.

Raymond Kammer, deputy director of NIST, made the announcement about the proposed signature standard last week at the House Technology and Competitiveness Subcommittee hearing on security policy.

He said NIST will seek a patent for its algorithm in order to offer it at no charge to companies interested in building encryption products to sell to the government.

Kammer also noted that the U.S. would allow the algorithm to be exported, in sharp contrast to current U.S. trade policy on encryption products.

The NIST proposal is only for digital signatures, not for the encryption of the files themselves, a NIST spokesman said, adding that the standards organization has no immediate plans to introduce a public-key encryption standard, a subject of much speculation during the past year.

Kammer assured Congress that the NIST/NSA signature algorithm had no "trapdoor" to let the government decrypt signatures at will, an idea proposed in ongoing discussions about a standard public-key cryptosystem.

(continued on page 6)

Agency's LAN internetwork vision begins to take shape

By Timothy O'Brien
West Coast Bureau Chief

SACRAMENTO, Calif. — For Gilbert Tafoya, data processing chief for the California Department of Veterans Affairs (CDVA), it was a case of all or nothing for his three-year, aggressive push for approval to implement an agencywide LAN internetwork.

His persistence paid off.

Tafoya's vision will begin to take shape this month when local-area networks will be installed at CDVA's headquarters here and further expand this fall when LANs are installed at 11 district offices across the state.

Since one of CDVA's principal functions is to provide home loans to veterans in the competitive mortage industry, one of the prime objectives of the network will be to reduce the application processing time from 40 to 20 days by giving district supervisors on-line account information.

To provide this level of access in the district offices, CDVA will install a data base management system on each LAN, enabling the agency to reduce costs by drastically cutting usage of mainframe time-sharing.

When Tafoya first proposed the use of LANs three years ago, planners in the state's central technology office encouraged

(continued on page 49)

Correction: A chart in the Buyer's Guide to bridges, routers and brouters (*NW*, June 3) included incorrect information about a bridge made by Timeplex, Inc. The TIME/LAN 10 does not support the Source Routing Transparent approach. It uses a proprietary technique called STRing and supports the Open Shortest Path First routing algorithm.

Multivendor user group formed with help and backing of Novell

By Caryn Gillooly
Senior Editor

NEW YORK — Novell, Inc. officially unveiled the Open User Recommended Systems (OURS) multivendor user group at the PC Expo conference here last week.

In the keynote speech, Novell President and Chief Executive Officer Ray Noorda announced the formation of the group, which he first hinted at a month ago ("Novell maps out plans for multivendor user group," *NW,* May 27), and named nine charter users and 18 charter vendors.

Some of the users sitting on the OURS steering committee include representatives from the Centers for Disease Control, The Chase Manhattan Bank, N.A., Lockheed Corp., Telecom Australia and Texaco Chemical Co.

Participating vendors include such industry heavy hitters as Compaq Computer Corp., Hewlett-Packard Co., IBM, Intel Corp., Lotus Development Corp., Sun Microsystems, Inc., 3Com Corp. and Ungermann-Bass, Inc.

The group will be similar to existing single-vendor user groups in that it hopes to address such topics as user networking problems and integration issues. However, OURS will consist of users of multivendor networks and the vendors that supply those nets.

The mission of OURS is the same as Noorda originally envisioned back in May: To drive the computer industry to user priorities, said Elaine Bond, senior vice-president of corporate systems at The Chase Manhattan Bank in New York. But this time, there are more voices speaking out in its favor, particularly user voices.

"In this industry, it's not always clear who to turn to to get issues solved," Bond said. "The wonderful thing about openness is we have great choice. The [not so] wonderful thing about great choice is great complexity. But single-vendor solutions are no longer the name of the game."

There is some question, however, whether the group will actually be run by users, as Novell is launching the group and may have more say than users want. But Bond said users' interests will come first.

"Novell's giving birth to us, but as soon as we can cut the umbilical cord, we'll love it," she said. "Without question, first and foremost, it's supposed to be a user group."

Bond conceded, however, that although the concept is good, the road ahead may not be an easy one.

Those interested in joining OURS can obtain more information by calling (800) 237-6877. ◘

Apple extends Mac's reach to IBM platforms

By Caryn Gillooly
Senior Editor

NEW YORK — Apple Computer, Inc. last week brought out its SNAps (pronounced snaps) family of IBM connectivity products, which will enable Macintosh users to access a variety of IBM computing platforms.

Unveiled at PC Expo here, the new products will support both terminal-emulation and peer-to-peer communications with IBM hosts, Application System/400 minicomputers and OS/2-based machines across a Systems Network Architecture net.

All in the family

Included in the family are SNAps Gateway, SNAps 3270 and two developers' tool kits.

The SNAps Gateway is software that uses LU 2 and LU 6.2 for simultaneous support of 3270 terminal emulation and Advanced Program-to-Program Communications (APPC) from the Macintosh to an IBM machine.

The gateway can be used either on an AppleTalk server, providing connectivity for an entire local-area network, or on an individual Macintosh. It can also be used in conjunction with the SNAps 3270, which is client software that enables a Macintosh to participate in a 3270 session with a host. SNAps 3270 also includes Control Unit Terminal and Distributed Function Terminal capabilities.

"The key to the new products is the integrated 3270 and APPC-to-SNA solution," said David Nagy, product marketing manager at Apple, based in Cupertino, Calif.

SNAps tool kit

Nagy also touted the third-party connectivity capabilities provided through the SNAps APPC Developers Kit and the SNAps 3270 Developers Kit.

The first lets third-party developers create LU 6.2 applications that, for example, enable a user to communicate with IBM's OfficeVision or host-resident data bases.

(continued on page 6)

In a world
where most modems
are created equal,

something unique
has just arrived...

Proposed legislation would open cable biz to RBHCs

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Lawmakers last week got feedback on a bill that would allow the RBHCs to enter the cable television business in exchange for a commitment from them to upgrade the public network to broadband fiber-optic facilities over the next 25 years.

Reps. Mike Oxley (R-Ohio) and Rick Boucher (D-Va.), along with Sens. Al Gore (D-Tenn.) and Conrad Burns (R-Mont.), introduced the bill three weeks ago.

At a hearing last week, the four claimed the proposed legislation would yield double benefits to the public. First, it would discipline the largely monopolistic cable industry, which has generated numerous consumer complaints about price gouging and poor service. Second, it would ensure that the U.S. public net stays on a par with those of international rivals.

Because Japan has instituted a program to deploy a fiber-optic, digital net by the year 2015, the bill targets that date for completion of the network upgrade here. Sponsors claim a fiber net will support a variety of interactive services that will aid businesses, education and health care.

But opponents question the need for fiber in the local loop, fearing carriers will raise rates in order to fund new cable ventures or finance the upgrade, which is estimated at about $400 billion.

At a hearing before the House Telecommunications and Finance Subcommittee, opponents raised those arguments against Oxley and Boucher's bill.

Gene Kimmelman, legislative director for the Consumer Federation of America, criticized the bill for choosing the regional Bell holding companies over possible competitors as the vehicle to deliver new broadband services.

"Requiring the FCC to prevent cross-subsidization and ensure that video investments or asset transfers are without cost to the ratepayers is like 'Mission Impossible' with the commission's limited auditing capacity and extensive responsibilities," he said.

Decker Anstrom, executive vice-president of the National Cable Television Association, said there is no need for the fiber-optic investment by the RBHCs since "virtually every service conceivable, except video, can be provided over the telcos' existing copper-based facilities.

"[The bill] would require American consumers to finance the telcos' $400 billion bet on becoming the TV tycoons of the 21st century," Anstrom said.

Rep. Edward Markey (D-Mass.) also voiced reservations. He said he supports efforts to establish goals for the national network but worries that the bill could hurt ratepayers.

"We must ensure that consumers don't have to foot the bill for services they don't want or investments that do little else than gold plate the network," Markey said. He added that the bill would have to include "strong fire walls to prevent cross-subsidies and anticompetitive behavior."

Rep. Dennis Eckart (D-Ohio) expressed exasperation at the RBHCs' grand claims about the benefits that will flow from the fiber investment. "It sounds to me like this bill will cure everything but baldness and the heartache of psoriasis," he said.

At the hearing, however, Boucher pointed out that a fiber-optic network capable of supporting broadband applications is vital to the future competitiveness of the U.S. "I don't want us to lose our leadership in the telecommunications industry," he said. "If we do, the results could be severe."

Several members of the subcommittee applauded the bill, which has six cosponsors, as well as Senate and White House support. Officials from the Commerce Department's National Telecommunications and Information Administration said the administration would endorse the plan if the mandatory date of 2015 was eliminated.

DEC breaks into token-ring mart

continued from page 2

DECnet Phase IV nodes.

The DEC TRNcontroller 100 will be available in September and will cost $7,910.

The Proteon agreement covers internetworking products, which include multiprotocol bridging routers. DEC already has agreements to market Vitalink Communications Corp. and Cisco Systems, Inc. bridging routers. In addition, DEC has its own line of multiprotocol routers and plans to build a high-end internetworking device.

"Our strategic relationship in this area is with Proteon," Daniels said. The agreements with Cisco and Vitalink allow DEC to support customers' existing networks, she said.

Proteon will also provide DEC with network management software that will enable the DEC Management Control Center network management station to manage token-ring networks, according to Proteon President Patrick Courtin.

The Proteon deal gives DEC access to quality token-ring technology, and the net management capabilities Proteon is currently developing will fit well with DEC's Enterprise Management Architecture, said Charles Robbins, director of communications research at Aberdeen Group, a market research firm in Boston.

Separately, DEC's Personal Computer Systems Group (PCSG) has formed a relationship with InterConnections to provide software called Leverage for PathWorks. The software will allow devices on non-DEC microcomputer LANs to access PathWorks services on computers running VMS.

The first product in the line, PathWorks Access Solution (PAS) for Transmission Control Protocol/Internet Protocol, will allow VMS systems to act as PathWorks servers for microcomputers on TCP/IP LANs. The software supports TCP/IP for VMS software from DEC, TGV, Inc., Network Research Corp. and Wollongong Group, Inc., as well as TCP/IP for DOS software from DEC, 3Com Corp. and Ungermann-Bass, Inc.

The Leverage for Pathworks line will be extended to support client systems on Xerox Corp.'s Xerox Network System nets and could be extended to support Novell, Inc.'s Internet Packet Exchange (IPX) protocol, according to John Rose, DEC's PCSG manager. "Customers have asked for the IPX capability. [DEC support for IPX] is reasonable to expect, but we won't give an exact time on that," he said.

PAS for TCP/IP is expected to be available next month and will cost $2,495 for each VMS license and $495 for a client license supporting five microcomputers.

Apple extends Mac's reach

continued from page 5

The SNAps 3270 Developers Kit lets third parties build LU 2 applications, such as alternative 3270 terminal emulators or graphical front ends to 3270-based applications.

Applications built using the development kits would work in conjunction with the SNAps Gateway.

Before the SNAps family, Apple offered customers MacDFT, which provided 3270 terminal emulation, and MacAPPC, which let third-party developers build APPC products for Macintoshes.

The SNAps Gateway is available now in versions that support eight, 32 and 64 sessions, costing $1,495, $2,995 and $4,995, respectively. SNAps is priced at $345. MacDFT customers may upgrade to the SNAps 3270 free of charge.

Years of planning pay off

continued from page 2

the same with the networks."

This effort began in late 1989, when AT&T proposed a custom voice/data network under Tariff 12 for Equifax. The carrier, in the firm's eyes, was becoming markedly more competitive.

"We were just starting to pull everything together when we were presented with this new opportunity," said Kies about the first Tariff 12 proposal.

Instead of accepting AT&T's Tariff 12 proposal, Equifax sought a wider range of options. The company created a network RFP, dubbed the Open Network Bid, that was sent to AT&T, MCI Communications Corp. and US Sprint Communications Co.

The Open Network Bid asked the carriers to submit proposals strictly for voice and data transport services.

In addition, Equifax's technology division consulted with top management about the company's direction. This input helped the group begin drafting a network strategy — dubbed the Equifax Telecommunications Strategy (ETS) — to marry business and technology strategies.

"It was the first time we had really gotten together with business leaders here and [learned] of their views and business plans — where they saw Equifax headed," Kies said.

With the company's business objectives in mind, the group began reviewing the carrier's bids. "All were promising," Kies said. "We looked at the prices proposed, the prices we were paying and at [mergers and acquisitions] that might come about."

Equifax turned down all bids. "Given the fluid nature of the company and the networks, and all the transitions we were going through, it didn't make sense to commit," he said.

But AT&T wouldn't take no for an answer. An AT&T team continued to analyze the traffic data and other information Equifax provided as part of the Open Network Bid and returned with two proposals last summer.

The carrier offered Equifax the choice of one of several existing Tariff 12 deals already on the books or working with AT&T to create a new custom network arrangement.

Equifax didn't see one alternative as more favorable than the other. The company did, however, decide to reopen its network bid. It once again invited MCI and US Sprint to join AT&T in competing for the Equifax network.

"We did our homework and kept in touch with Tariff 12, [Virtual Network] and [Virtual Private Network] customers with regard to savings," Kies said. "They told us what savings they had encountered by moving to custom networks, and we made projections based on that information."

But when Equifax ascertained what its actual savings would be, it again decided against any move.

"There was not enough gain to make the pain of any transition worthwhile," Kies said. "We decided we would be better off to stay where we were for the time being and to proceed with the longer range strategic plans. We felt ETS would give us an excellent road map to our networking future."

With ETS complete, Equifax last week sent out an RFP that details its backbone network, service and support, network management and messaging requirements. The company expects to award the project by year end.

NIST proposes standard

continued from page 4

Once the signature standard is adopted as a federal standard, civilian agencies would be required to use it to exchange files containing sensitive or classified information.

Kammer said the Department of Defense also appeared ready to support NIST's selection, a move that would broaden the standard's use. Defense contractors and the banking industry are also required to adhere to federal standards in their transactions with the government.

Kammer told Congress that NIST did not select any of the available signature methods because the government did not want to pay royalty fees.

Industry experts reacted critically to the NIST selection.

Michael Baum, head of Cambridge, Mass.-based Independent Monitoring and an attorney specializing in electronic messaging security issues, called the NIST decision disappointing.

"All of a sudden, all of us are faced with something that no one knows anything about," Baum said.

He noted that RSA's algorithm has stood up to scrutiny, while the NIST algorithm, to be published in about a month, is an unknown quantity.

Others raised questions about performance. Addison Fischer, president of Fischer International, a producer of security products and licensee of RSA's algorithm, said the ElGamal method the NIST standard is based on is at least 30 to 40 times slower in processing signatures than the RSA method.

"The rest of the world has adopted RSA for both data encryption and digital signature," Fischer said, adding that the International Standards Organization has recommended RSA as a method for digital signatures.

CCS7 woes fuel outages for 2 telcos

continued from page 1

number of major CCS7-related net outages during the past 18 months. In January 1990, AT&T suffered a devastating network malfunction caused by problems in its CCS7 net.

According to Don Burns, vice-president of planning and engineering at Bell Atlantic, the network outage was caused by the failure of a circuit board in a signal transfer point manufactured by DSC Communications Corp.

Once the hardware failure occurred, the signaling network was flooded with maintenance messages, overloading three other signal transfer points in the area and bringing the entire network down within 45 minutes.

A signal transfer point serves as the controller for messages on an CCS7 network.

The effects

The four afflicted signal transfer points served Maryland, Virginia, West Virginia and Washington, D.C. About 90% of the customers in those areas are served by CCS7-controlled facilities, the Bell Atlantic spokesman said. Users in Delaware, Pennsylvania and New Jersey are served by other signal transfer points and were not affected.

The malfunction disrupted most local calls but did not prevent users from receiving long-distance calls. Bell Atlantic reported some problems in originating interstate calls from the affected areas. However, users were able to make local calls to others served by the same central office but not between central offices.

The government's huge Federal Telecommunications System (FTS) 2000 network was only minimally affected, according to AT&T and US Sprint Communications Co., the two FTS 2000 carriers. Users were able to complete on-net calls because most government locations have dedicated access to FTS 2000, said Jack Tozier, manager of US Sprint's FTS 2000 net management center.

Calls placed to or from points off the network were disrupted, however.

Bell Atlantic has plans to interconnect its CCS7 net with those of the long-distance carriers later this year. The spokesman said it is unclear whether the network problem could have spread to the interstate nets if Bell Atlantic had already completed that project.

Trouble on the other coast

Ironically, during the outage on the East Coast, Pacific Bell had a similar problem in the Los Angeles area that affected more than three million lines.

The three-hour outage in the state's most populous LATA was caused by a software glitch in a signal transfer point also made by DSC. The problem caused the signal transfer point to remove itself from service.

"This caused our [California signal transfer points] in Gardena, Anaheim and Sherman Oaks to become congested with messages sent telling them to reconfigure the network around the [node] in trouble," according to a Pacific Bell internal report.

The congestion caused "a massive network backup," said a spokesman for the carrier. The service disruption, which affected users in the 213, 818 and 805 area codes, began at 11 a.m. PST and ended at 2:30 PST, he said.

Users in those area codes could not complete intra-LATA calls for the duration of the interruption but could place calls to points outside the LATA.

Berge Ayvazian, a telecommunications analyst with The Yankee Group in Boston, said such outages will likely prompt local carriers to beef up redundancy in their CCS7 networks and draft disaster plans. But he added that outages are to be expected until carriers complete their installations of CCS7, which some analysts say will not occur until 1995.

"The transition period to [CCS7] is one in which the public network is vulnerable, and [local carriers] need to take steps to make [CCS7] fully redundant," Ayvazian said. "[CCS7] is the nervous system of the network, and if it goes down, the net goes haywire."

Most major network users last week said the outages were only minimally disruptive.

Bill Coleman, a technician in Citicorp U.S. Card Products Group's network services group, said the only net service completely knocked out last week was a personal computer-based verification system the firm uses to ensure that point-of-sale terminals are working.

The company, which processes credit card authorizations for credit cards in the Baltimore area, was able to work around the problem by dialing out on dedicated lines to a different central office switch, from which it was able to complete calls, according to Coleman.

A spokesman for Aeronautical Radio, Inc., a major supplier of communications services to airlines, said the firm did not experience major disruptions. "The large majority of our business is long distance; therefore, we only experienced a modest impact," he said.

Pacific Bell customers felt some impact from the service disruption. "Although our divisions are on our private network and were unaffected by the problems, local firms experienced some difficulty reaching our office [in the 818 area code]," said Maralyn Rosenblatt, a senior technology specialist with Lockheed Corp. in Calabasas, Calif. ◘

...Announcing
a new modem
so flexible,
it will change your mind forever
about modems.

The new COMSPHERE™ 3800 Series SD (Software-Defined) Modem is so flexible, you only dial one number--the Software Support Center--to select new features as you need them. The software is simply downloaded over the public telephone network. No more strapping, chip replacements, expensive downtime, or exchange of modems. Add the new COMSPHERE 6700 Dial Network Management System, a powerful PC-software package with Windows* 3.0, for detailed modem management tools and the most comprehensive VF-line diagnostics in the industry.

To change the way you think about modems,
call 1 800 482-3333, Ext. 502, or contact your
local authorized distributor.
You may also fax your request to 1 813 530-2103.

AT&T Paradyne

COMSPHERE is a trademark of AT&T. *Windows is a trademark of Microsoft, Inc.

Visit us at ComNet West Booth #1035

The Most Advanced Network Solutions On The Most Powerful Workstations.

Networked Sun Systems From ERI.

Sun's SPARCstation IPC and ERI's expertise are an unmatched combination for powerful networking capabilities. The IPC delivers high processing power, large disk capacity and expansion capabilities that meet the needs of the most demanding users. With up to 48MB of RAM, an MS-DOS compatible floppy disk drive, choice of color or monochrome displays, and both internal and external disk capacity, the IPC offers the perfect balance between maximum performance and affordability.

Sun users benefit from the power of UNIX for multi-tasking, connectivity to PCs and mainframes; easy-to-use menu-driven applications; multimedia capabilities; simple transfer of files, data, and applications. And, with Sun SPARCstations you also get complete compatibility with over 2,100 SPARCware applications, including Lotus 1-2-3, WordPerfect, dBASE IV, and Uniplex II Plus Windows.

Get the most advanced network solutions you'll ever need from the nation's leading full-service Systems Integrator for Sun Microsystems. Call ERI today at (800) 222-1050. Ask for Dept. C.

ERI™

Answering your needs today.
Anticipating your needs for tomorrow.

Corporate Headquarters: 180 Vanderbilt Motor Parkway, Hauppauge, NY 11788-9682
(800) 222-1050 Fax (516) 435-0995

All names, products and services mentioned are the trademarks or registered trademarks of their respective organizations.

sun Value Added Reseller

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

"By choosing [Switched Multimegabit Data Service] over frame relay, I think the RBHCs may find themselves stranded."

Rick Malone
Principal
Vertical Systems Group
Dedham, Mass.

People & Positions

The **Open Systems Interconnection/Network Management Forum** recently elected a new slate of officers at its annual meeting in Hong Kong. **Keith Willetts,** British Telecommunications PLC's product line manager for network management systems, was reelected chairman of the board of trustees. **Bill Gilbert,** director of network management at AT&T, was named president.

Stan Smits, telecommunications engineering manager at Digital Equipment Corp., was named vice-president. **Robert Smith,** director of network management at IBM, was reelected as treasurer. **Bob Emerson,** network, research and development manager at Hewlett-Packard Co., was elected secretary.

New York Telephone Co. recently announced a reorganization plan, effective July 1; which creates three geographic market areas for the state of New York.

Douglas Mello, president of Nynex Business Informàtion Systems Co., will be responsible for midtown and lower Manhattan. **Arnold Eckelman,** assistant vice-president of operations, will be responsible for upper Manhattan, the Bronx, Brooklyn, Queens and Staten Island. **Patricia Higgins,** formerly vice-president of international sales with AT&T Network Systems Group, will be group vice-president for Long Island, as well as the mid-state and upstate regions. ☐

MFS joins alternative access carrier trade organization

Carriers will work to dissolve regulatory barriers.

By Bob Brown
Senior Editor

OAKBROOK TERRACE, Ill. — Metropolitan Fiber Systems, Inc. (MFS) recently announced it has joined the Association for Local Telecommunications Services (ALTS), a trade organization for alternative access carriers.

MFS is among the largest of such carriers, operating networks in 11 major U.S. cities, and had been conspicuously absent from ALTS, which boasts 22 alternative access carrier members and nine affiliate equipment manufacturer members.

By joining ALTS, MFS hopes to work more closely with other alternative access carriers to break down regulatory barriers precluding a local access market in which users are free to choose between multiple carriers, said Doug Bradbury, MFS senior vice-president of corporate affairs.

These barriers include restrictions on MFS and its counterparts on locating their network equipment inside existing central offices operated by the regional Bell holding companies and other established local carriers, Bradbury said. Lifting the barriers promises users improved access to alternative access carriers in that they could do so through either the existing switched network or via a direct fiber link.

MFS has already spearheaded the Local Equal Access Initiative, a filing that led to the Federal Communications Commission's May 9 order proposing that competitive local access carriers be allowed to interconnect their networks with the local telephone company networks in order to gain access to more potential customers ("FCC plans to open bypass net options," *NW,* May 13).

"ALTS member companies will add increased strength to the MFS Local Equal Access Initiative," Bradbury said. "The more forcefully we can present our views to regulators and the Bell monopoly, the faster the competitive local access industry will be able to serve the increasing demands of the local telecommunications marketplace."

MFS was a member of ALTS when it was formed in the late 1980s, but left because MFS officials felt that many of the other members were just starting up and didn't have much in common with MFS, a spokeswoman said. As the industry has matured, the interests of MFS and other local access carriers have become more similar, she explained.

According to John Shapleigh, ALTS president and general counsel, the addition of MFS as an ALTS member "will enhance the ability of ALTS to bring the benefits of competition to local telecommunications users." ☐

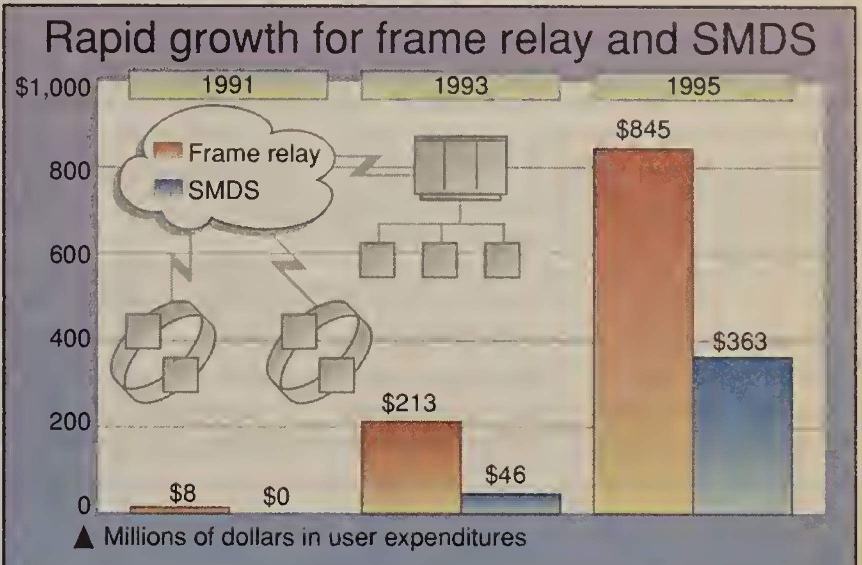
INDUSTRY BRIEFS

3Com reports financials. 3Com Corp. last week reported sales of $92.8 million for its fourth quarter ended May 31, a 20% drop from revenue of $116.8 million posted for the fourth quarter of 1990. Net income fell 55% to $3.3 million from $7.3 million in the fourth quarter last year. However, 3Com officials were encouraged that orders during the fourth quarter totaled $96.5 million, an increase of 10% over third-quarter orders.

For the 1991 fiscal year, 3Com posted sales of $398.6 million, down nearly 5% from $419.1 million in sales last year. The Santa Clara, Calif., maker of adapter boards and internetworking gear posted a loss of $27.7 million for the year compared to earnings of $20.5 million last year. The 1991 earnings would have been $15.4 million without a onetime restructuring charge of $67 million taken by 3Com during this fiscal year.

Novell licenses protocols. Novell, Inc. recently announced it will license its proprietary Internet Packet Exchange/Sequenced Packet Exchange (IPX/SPX) transport protocols to software developers. The NetWare Transports Licensing Program offers two options. The first option allows developers to redistribute native NetWare client software, such as IPX and SPX, with network applications and hardware. That

(continued on page 10)



Figures are estimated. SMDS = Switched Multimegabit Data Service

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: INFONETICS RESEARCH INSTITUTE, INC., SAN JOSE, CALIF.

Frame relay, SMDS drawing battle lines

Report predicts explosive growth of wide-area market, with both services redefining user nets.

By Bob Brown
Senior Editor

SAN JOSE, Calif. — The stage is being set for a major battle between two highly publicized, emerging wide-area network services — frame relay and Switched Multimegabit Data Service (SMDS) — according to a new study.

The study, released by Infonetics Research Institute, Inc., states that the frame relay and SMDS markets are poised for explosive growth, and that positioning of the technologies will shape the future of the WAN market. The report is titled, "Wide Area Data Networking: Frame Relay and SMDS."

"Frame relay and SMDS both represent new approaches to wide-area networking," said Michael Howard, president of Infonetics, a market research firm based here. "Although many observers contend today that they are complementary rather than competitive offerings, our research does not support that view. We found that users are generally planning to implement either frame relay or SMDS."

Frame relay is a connection-oriented interface specification designed to support transmission of local-area network and other data traffic at speeds up to 1.544M bit/sec. It is more efficient than X.25, another packet-oriented transmission service. SMDS is a connectionless, cell relay-based service well-suited for speeds of T-1 and beyond.

Here today, gone tomorrow?

According to the study, frame relay has taken an early lead in user acceptance largely because frame relay equipment and services are becoming more available. The market for these services and equipment is currently at $8 million annually, but that figure is expected to reach $845 million by 1995.

SMDS offerings are not yet generally available; however, the SMDS market is expected to reach over $360 million by 1995, the study said.

The frame relay-SMDS battle could be similar to the fight between Transmission Control Protocol/Internet Protocol and Open Systems Interconnection for multivendor networking.

> Frame relay and SMDS both represent new approaches to networking.
>
> ▲▲▲

"While SMDS, like OSI, holds great promise for users, it's frame relay and TCP/IP that are giving users what they need now," Howard said.

One large user, who requested anonymity, said frame relay is the clear choice over SMDS today and for the near future because SMDS has been positioned largely as a regional or metropolitan-area service.

"We're looking for wide-ranging connectivity," he said. "SMDS, as it's been presented by carriers so far, is limited geographically."

According to Bill Stensrud,

(continued on page 10)

Industry Briefs

continued from page 9

will make it easier for users to integrate third-party products into their NetWare local-area networks because the task of installing the protocols is done by the developer and not the end user. The second option allows developers to obtain source code from Novell for IPX, SPX, Network Basic I/O System and other modules. This will let developers improve the performance of their products on a NetWare net.

Senate voices net concerns. The Senate Appropriations Committee recently said it is concerned about the potential intrusion of the General Services Administration and Federal Telecommunications System (FTS) 2000 into microwave networks operated by the Department of Energy's five federally run power utilities. The committee, chaired by Sen. Bennett Johnston (D-La.), said that the GSA's recent order to the Energy Department to transfer all network traffic to FTS 2000 by Sept. 30 may have a "costly and reliability-degrading impact" on power-system control.

Utilities oppose GSA mandate. The American Public Power Association (APPA), which represents 1,750 power utilities, recently issued a statement opposing the GSA's order to the Department of Energy's five federally run power utilities to migrate from existing microwave networks to services covered by the Federal Telecommunications System (FTS) 2000 contract by Sept. 30. "The APPA opposes any action to require the Power Marketing Administrations to use FTS 2000 for power-system control or to transfer power-system control telecommunications systems out of [Power Marketing Administration] control," the association stated in its resolution.

Unisys, Peat Marwick join forces. Unisys Corp. and KPMG Peat Marwick last week announced an agreement under which they will conduct joint software development, systems integration and marketing activities. The initial agreement only covers business activities in the U.S.

The companies will work together to develop electronic data interchange, imaging and other applications designed to run on Unisys and other hardware platforms. A Technology Resource Center has been established in Atlanta as the main site for alliance development, integration and demonstration activities.

Vitalink, Cincinnati Bell ink deal. Vitalink Communications Corp. last week said Cincinnati Bell Supply, a division of Cincinnati Bell, Inc., will resell Vitalink's line of internetworking products.

Cincinnati Bell Supply will market and distribute Vitalink's Ethernet and token-ring bridge and bridge/router products through its direct sales force covering Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, Tennessee and West Virginia. Vitalink will provide Cincinnati Bell Supply customers with technical training and support.

Vitalink is in the midst of being acquired by Network Systems Corp. ☒

Frame relay, SMDS drawing battle lines

continued from page 9

vice-president of marketing at StrataCom, Inc., a San Jose, Calif., multiplexer vendor that offers a frame relay interface on its IPX FastPacket switches, "SMDS is a tough sell today." Frame relay can be implemented via a simple upgrade to existing equipment, whereas SMDS support typically requires adding new software and hardware, he added.

"Using SMDS today is like putting a V-8 on a skateboard. It's overkill."

▲▲▲

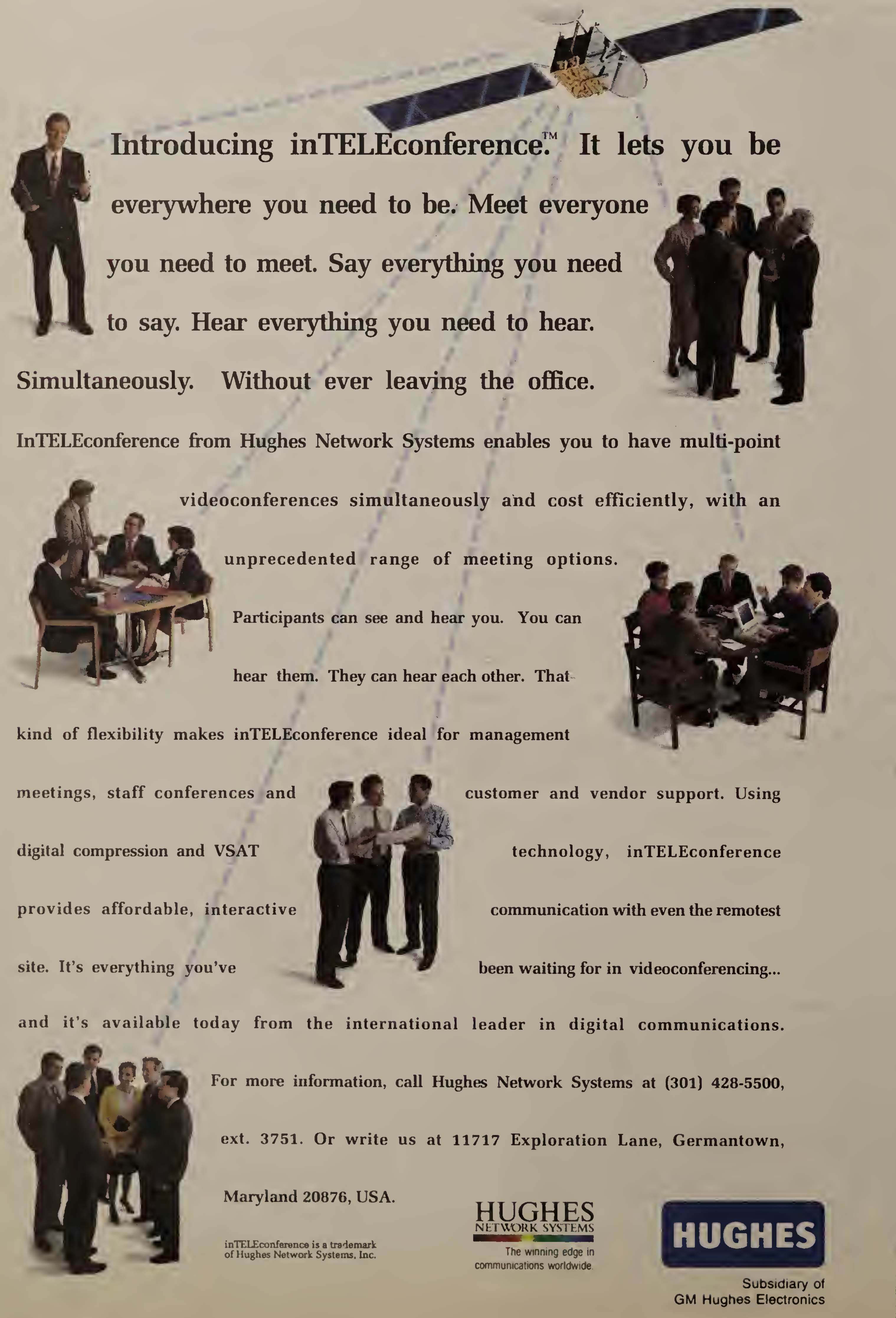
"The real incentive for users to move to SMDS will be when they [migrate] toward broadband ISDN" to support data, as well as video, voice and other network traffic, Stensrud said. "Using SMDS today, in most instances, is like putting a V-8 on a skateboard. It's overkill."

According to the Infonetics study, by 1995, about 20% of users' network traffic will be non-voice/data traffic, such as video and image — a good sign for SMDS backers. That figure compares to a negligible amount of non-data traffic today, the study said.

Joe Simone, director of switched data services with Pacific Bell's Data Communications Group, said the carrier is testing both SMDS and frame relay to enable users to choose between the technologies. Initially, the regional Bell holding companies were putting all their money on SMDS, but recently the carriers have started to recognize growing user interest in frame relay.

Pacific Bell plans to start a frame relay trial later this year, he added.

"Even with the technology trials, it'll be hard to say which technology will win out until the services are tariffed and users can compare prices," Simone said. ☒



Introducing inTELEconference.™ It lets you be everywhere you need to be. Meet everyone you need to meet. Say everything you need to say. Hear everything you need to hear. Simultaneously. Without ever leaving the office.

InTELEconference from Hughes Network Systems enables you to have multi-point videoconferences simultaneously and cost efficiently, with an unprecedented range of meeting options. Participants can see and hear you. You can hear them. They can hear each other. That kind of flexibility makes inTELEconference ideal for management meetings, staff conferences and customer and vendor support. Using digital compression and VSAT technology, inTELEconference provides affordable, interactive communication with even the remotest site. It's everything you've been waiting for in videoconferencing... and it's available today from the international leader in digital communications.

For more information, call Hughes Network Systems at (301) 428-5500, ext. 3751. Or write us at 11717 Exploration Lane, Germantown, Maryland 20876, USA.

inTELEconference is a trademark of Hughes Network Systems, Inc.

HUGHES
NETWORK SYSTEMS
The winning edge in communications worldwide

HUGHES
Subsidiary of
GM Hughes Electronics

TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

One in every five new telephones is cellular, according to AT&T Bell Laboratories. By the year 2000, the number of cellular customers could mushroom to 25 million.

Carrier Watch

AT&T last week announced a 900 service that uses regular phone lines to link a computer-based 900 program on the user's premises to the nearest AT&T point of presence (POP).

The service, dubbed MultiQuest Express900, offers users an alternative to AT&T's existing MultiQuest 900, which requires dedicated access between the user site and an AT&T POP.

MultiQuest Express900 makes 900 service affordable for smaller users that may have previously wanted to establish 900 programs to provide information to their customers but didn't because the access costs were too high.

The service is designed for users that expect less than 100 hours of incoming calls a month. MultiQuest Express-900 service also lets large firms test pay-per-call applications without a major investment.

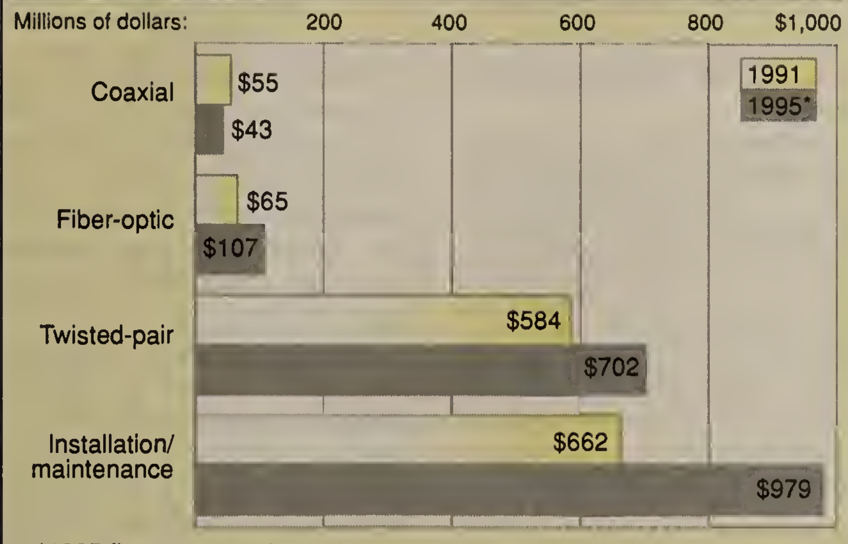
Users must begin each MultiQuest Express900 message with a description of call prices and program content. Callers must be given time to decide whether to stay on the line or hang up without incurring charges.

Users pay a onetime $1,000 installation charge for the first MultiQuest Express-900 number, a monthly $75 fee and usage at 42 cents per minute, billed at .007 cents per second with a 30-second, 21-cent minimum.

MCI Communications Corp. last week announced three contracts totaling $25

(continued on page 12)

European market for premises cabling systems



*1995 figures are estimated.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: FROST & SULLIVAN, INC., NEW YORK

MCI offers association unique calling card plan

Program also gives discounts on other services.

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — MCI Communications Corp. recently announced a so-called affinity program for the National Association of Securities Dealers, Inc. (NASD) under which the group's 5,500 member groups will receive a unique calling card service and steep discounts on network services.

Besides making a host of unusual calling card features available to the 400,000 registered securities representatives of member firms, the program will give companies 20% to 35% discounts on MCI Preferred, Prism Plus, Prism 1, Vision, 800, Vnet virtual network and data services.

Developed exclusively for NASD, the package of calling card services can be used to make domestic and international long-distance calls, reach directory assistance, create voice messages, set up conference calls and access MCI's Voice News Network (VNN) to hear the latest news, weather, financial and sports information.

How to use it

To place long-distance calls, users dial an 800 number to access the MCI network, receive a tone and enter their 14-digit authorization code. They then hear a beep, after which they dial the number they're trying to reach or enter a * and digit to access one of the card's other features.

Callers press *1 to hear recorded information from VNN; *2 to establish a conference call using MCI Forum; *3 to reach their voice mailbox; *4 to use MCI Messenger, a voice mail message delivery service; and *5 to hear stock quotes.

When callers enter the VNN, they are greeted by a voice response system and presented with a new list of options: press 1 for the weather, 2 for sports, 3 for financial news, and so on. When a selection is made, the recorded information is played to the caller.

Callers that want to establish conference calls are connected with an MCI Forum operator who dials the appropriate parties. Callers access their voice mailboxes by entering a password. NASD securities representatives can use MCI Messenger to deliver and play voice mail messages to any MCI subscriber once that person is off the phone.

One innovative feature of the NASD card lets users check real-time quotes on stocks listed on the NASD Automated Quotations system or other major exchanges. Callers are prompted to enter a multidigit account code and are provided with three options; press 1 for stock quotes, 2 for a market overview or 3 for a portfolio service.

Once connected, callers can dial a two-digit stock code to hear the latest quote for that stock. The market overview gives the volume of shares traded on the New York Stock Exchange; the Dow Jones industrial, transportation and utility averages; and Standard & Poor's Corp.-listed company stocks.

The NASD card also enables securities representatives to build two personalized portfolios of up to 30 stocks each. To do

(continued on page 12)

FCC progress slowed by portable 800 issue

Sikes says concerns are delaying decisions on Tariffs 12 and 15 and slew of other proceedings.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The inability to use the same 800 number with different long-distance carriers has long been a headache for network managers, but the issue has now evolved into a troublesome regulatory quandary that has delayed the resolution of multiple FCC proceedings.

At a congressional hearing and again at an informal press briefing late last month, Federal Communications Commission Chairman Alfred Sikes conceded that nagging questions about the availability time frame for portable 800 numbers have prevented the agency from moving forward on a number of issues.

"We have not acted as quickly on Tariff 12 and 15 as we otherwise would have acted because they were brought into the larger long-distance proceeding along with 800 number portability," Sikes said.

The FCC has decided to group these proceedings together, delaying the resolution of some until it can sort out questions surrounding the 800 market.

Because 800 services have become almost inextricably intertwined with other corporate network offerings, regulators believe they must sort out questions about AT&T's potential power to harm competition through its dominant position in the 800 market before addressing other issues. AT&T holds 80% of the 800 market, according to current FCC figures.

AT&T's position in the 800 market has affected the speed of the FCC's larger proceeding examining the proper level of regulation for the carrier. Regulators must decide whether it is possible to lessen regulation for AT&T in some areas while it retains such a powerful position in the increasingly important 800 market.

The questions surrounding 800 services have also had an impact on Tariffs 12 and 15, which have taken effect but are under FCC investigation. Before it completes its investigation into the lawfulness of the custom network deals, regulators must decide whether allowing AT&T to bundle 800 service into these tariffs

(continued on page 12)

WASHINGTON UPDATE

BY ANITA TAFF

AT&T responds to MCI's complaint. AT&T sent a letter to the Federal Communications Commission last week in response to an MCI Communincations Corp. complaint about AT&T's handling of a Tariff 12 deal for Bridgestone/Firestone, Inc.

This is only the latest defense of AT&T's decision to rework a Tariff 12 deal for Bridgestone/Firestone in which it cut the minimum annual charges for that network by 61%. AT&T already explained to the FCC that the user was having business difficulties and was unable to meet its guaranteed annual payments. AT&T then renegotiated a drastically lower minimum annual charge and raised rates, restructured volume discounts and made other changes. MCI sent a letter complaining to the FCC that such drastic changes undermine the fixed-rate, fixed-term characterization that AT&T has offered to justify discounts under Tariff 12.

In its response, AT&T said, "Contrary to the impression conveyed by MCI's letter, AT&T has not unilaterally released the . . . customer from its minimum annual charge obligation. Rather, that customer and AT&T have substituted a new set of mutual commitments that meet the customer's needs for a reduced minimum charge and, at the same time, increase the profitability of this [Tariff 12] option to AT&T."

FCC turns 57. Federal Communications Commission Chair-

(continued on page 12)

FCC progress slowed

continued from page 11

gives it an unfair advantage in selling the deals.

The dilemma the FCC faces on 800 is that customers are locked into 800 numbers that are assigned to particular carriers because the regional Bell holding companies do not have the technology to reroute 800 numbers to other carriers.

Sikes conceded at the congressional hearing that the agency is struggling to answer these complex questions. "I am concerned about [800 portability], and I think that it has to be considered in the bundling issue, where AT&T might use that [position] to its advantage."

Opponents of Tariff 12 have complained that allowing AT&T to bundle 800 service into the packages harms competition because AT&T can use its power in the 800 market to beat out rivals on the discounted deals.

They point out that the FCC had ruled against such an arrangement in June 1990, when it rejected a proposal from AT&T to give a combined discount on 800 and Software-Defined Network (SDN) services.

Tariff 12 deals are essentially SDN networks with 800, private-line or international services packaged together.

Rivals argue that if the FCC thought it was wrong for AT&T to offer combined 800 and SDN discounts, the carrier should not be allowed to include 800 services in the SDN-based Tariff 12 deals. However, users say that Tariff 12 stripped of 800 services would be less attractive.

If AT&T is going to retain its dominance in 800 services, the only other alternative for the FCC is to speed up the RBHC implementation of technology that allows 800 portability.

The FCC completed a proceeding in April 1989, in which it ordered the RBHCs to begin installing data bases needed to support 800 portability. However, the data base lookup using current in-band signaling technology could quadruple call setup time.

By using the out-of-band signaling available with Common Channel Signaling System 7 (CCS7), there would be no such delay. But most of the RBHCs are several years away from widespread CCS7 availability in their networks.

In the interim, the FCC said the RBHCs can not switch over to the 800 data base technology until they have implemented CCS7 on all their tandem switches and 80% of the nation's traffic originates at central offices with CCS7 capabilities. This will not occur until 1992 or 1993 by most estimates.

Unhappy users and carriers asked the FCC to reconsider this decision. Several user groups, including the International Communications Association, are asking the FCC to allow RBHCs that are moving forward quickly with CCS7 implemenation to be allowed to cut over to 800 data base technology early and offer the lookup on a regional basis.

Sikes will not comment on exactly what alternatives the agency is considering, other than to say it is trying to figure out a way to either speed CCS7 implementation or reduce call setup time without CCS7. He told Congress that the FCC expects to issue a new ruling this summer on 800 portability in conjunction with its decisions on Tariffs 12 and 15, and AT&T regulation.

Carrier Watch

continued from page 11

million with three Richmond, Va. companies: Circuit City Stores, Inc., Ethyl Corp. and Signet Bank International.

MCI signed a five-year contract to provide Circuit City Stores, an appliance and consumer electronics retail chain, with Vnet virtual network service to link 199 stores across the nation to its Richmond headquarters. Circuit City Stores employees will also use the carrier's MCI 800 and calling card services.

MCI signed a three-year contract to build Ethyl, a chemical company, with a Vnet linking 29 locations to its Richmond headquarters. Ethyl will also use the carriers digital data and calling card services.

And MCI said it will provide Signet Bank with a Vnet that links 235 offices in Maryland, Virginia and Washington, D.C. to its Richmond headquarters. Signet will use both MCI's 800 and digital data services.

MCI Communications Corp. recently announced a three-year, $7.2 million network services contract with Inter-Regional Financial Group, Inc. (IRF).

IRF provides full-service securities and investment banking services in 21 states through its subsidiaries, Dain Bosworth of Minneapolis and Rauscher Pierce Refsnes of Dallas.

Under the agreement, MCI will provide a variety of services to Rauscher Pierce Refsnes' and Dain Bosworth's 65 customer locations in the Western U.S., New York and Chicago, as well as become IRF's primary long-distance carrier.

Rauscher Pierce Refsnes will use MCI's Vnet virtual network service. Both companies will use the carrier's 800 and calling card services.

MCI network services will replace offerings from AT&T, US Sprint Communications Co. and several regional carriers, according to an MCI spokesman.

AT&T last week announced that it received a two-year, multimillion dollar network services contract renewal from The Circle K Corp., a large convenience store chain based in Phoenix.

Under the agreement, AT&T will provide long-distance service to 10,000 public telephones at 3,500 Circle K stores in 31 states. The convenient store chain is one of AT&T's largest public telephone customers.

The University of Wisconsin System President Kenneth Shaw last week accepted the donation of 90 miles of fiber-optic cable and related equipment, worth an estimated $350,000 from **MCI Communications Corp.**

The MCI fiber will be installed as part of a planned $6 million, nine-campus fiber-optic net under consideration by the state. Once completed, it will carry voice, data and video traffic.

The network will support two-way video for so-called distance learning programs, videoconferencing and live broadcast of campus events.

MCI offers unique plan

continued from page 11

this, callers create a password and store the symbol for, and the number of shares in, each of the 30 stocks on an MCI computer in Cedar Rapids, Iowa.

Then the next time the user calls, he enters his password and personal identification number to hear the current market value of each portfolio. The caller can also instruct the system to play the latest quote for any stock in either set or add and delete stocks from both portfolios.

New tools

"The combination of advanced information services and the real-time quote system will afford members powerful new tools to enhance their productivity and ability to serve their customers," said Joseph Hardiman, NASD's president.

Users pay a flat per-minute charge for interstate calls during day, evening and night/weekend calling periods. They pay a $10 monthly charge for services accessible using the card and 59 cents per minute for real-time stock quotes and the portfolio feature.

The marketing agreement between MCI and NASD is the most recent of two projects involving the groups. Last February, NASD selected MCI to design, construct and manage a new nationwide data network for NASD. The new network is scheduled for completion next month ("NASDAQ enlists MCI muxes to construct nationwide net," *NW,* March 4).

Early user brands SDDN ideal for videoconferencing

Service offers good circuit quality at a low cost.

By Bob Wallace
Senior Editor

WOODCLIFF LAKES, N.J. — An early user of AT&T's Software-Defined Data Network (SDDN) said the service rivals leased-line performance to support videoconferencing sessions and is less expensive than public room services.

Multiplexer maker Timeplex, Inc., the first user of SDDN's 384K bit/sec option, has been using the service since March to support videoconferences between its U.S. headquarters here and a customer service center in Clearwater, Fla.

"We've had no problems since we began using the service several months ago," said Jim Naylor, Timeplex's telecommunications director. "SDDN 384 is as good as private lines as far as circuit quality and performance are concerned."

Timeplex said it will evaluate the use of SDDN for local-area network interconnection, bulk file transfer and the backing up of dedicated data lines between here and Clearwater. SDDN, the data equivalent of AT&T's virtual voice service, is offered as an option to the Software-Defined Network service and enables users to establish high-speed switched data links on demand.

SDDN is accessed using an Integrated Services Digital Network Primary Rate Interface or AT&T Dataphone Digital Service, and is currently available at 56K, 64K and 384K bit/sec. Next year, SDDN will support 1.544M bit/sec dial-up links.

The service is best suited for such applications as LAN interconnection, videoconferencing and disaster recovery, according to early users ("Early users praise AT&T's virtual data network service," *NW,* June 3).

Timeplex uses a 384K bit/sec link to connect a videoconferencing room behind a Timeplex ISDN Gateway Server multiplexer here with its national customer service center in Clearwater. Timeplex uses T-1 access to reach the AT&T point of presence nearest each site.

Naylor said the videoconferences range in duration from one to five hours and that Timeplex expects to use SDDN as much as 40 to 60 hours a month.

Before SDDN, Timeplex used US Sprint Communications Co.'s The Meeting Channel public room videoconferencing service to link executives here with those at the customer service center.

According to Naylor, SDDN is easier to use than The Meeting Channel — which requires users to make a reservation — and is also less expensive, though he declined to say how much. With SDDN, "we can establish a videoconference or any high-speed data connection immediately."

To set up a SDDN connection, users dial a 700 number from a push-button telephone or microcomputer keypad. The call is routed to a high-bandwidth time slot interchange board in a central office-based 4ESS switch.

That board routes the incoming 384K bit/sec HO channel to six contiguous 64K bit/sec DS0 time slots on a T-1 link between AT&T central offices.

The ISDN Gateway Server multiplexer was equipped with a prototype SDDN software interface that the vendor will offer as a standard feature with the multiplexer next year.

Washington Update

continued from page 11

man Alfred Sikes marked the 57th anniversary of the Communications Act of 1934 last week by issuing a statement comparing the FCC then and now. The Act was signed into law on June 19, 1934 by former President Franklin Roosevelt. It created the FCC, which then had seven commissioners, 233 employees and a budget of $1.14 million. Now the FCC has two fewer commissioners, 1,763 staff members and a budget of $116.8 million. During the same period, the phone industry has grown from revenues of $940 million to $175 billion.

Plea to modify embargo. An AT&T executive last week urged the U.S. government to aid consumers and corporations doing business with Vietnam by lifting a 16-year-old ban on international telephone service to that country. Since the close of the Vietnam War, the U.S. has had an embargo on all goods and services to Vietnam.

But Dwight Jasmann, president and managing director of AT&T Communications Pacific, Inc. told lawmakers at a hearing last week that black market operators are getting around the embargo by routing traffic through countries such as Canada and Japan. Those operators charge as much as $80 for a 10-minute call, which is about double the rates AT&T charges for calls to other countries in that region, Jasmann said. He urged Congress to set up an arrangement similar to that of Cuba, which has also been under a U.S. trade embargo for years.

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

Unix International, Inc. recently announced availability of an application program interface that lets programmers write Open Systems Interconnection-compliant applications for Unix System V environments. To obtain the document, contact Unix International of Parsippany, N.J., at (201) 263-8400.

Data Packets

Unisys Corp. last week announced that its Open Systems Interconnection laboratory has become the ninth lab to be accredited by the National Institute of Standards and Technology under its National Voluntary Laboratory Accreditation Program. This will allow Unisys to conduct the OSI tests required to meet U.S. Government OSI Profile specifications. The tests for which Unisys has been accredited include OSI File Transfer, Access and Management, X.400, Connectionless Network Protocol, Transport Classes 0 and 4, and Embedded Session.

IDEA, of Billerica, Mass., last week introduced personal computer software that runs as a Microsoft Corp. Windows 3.0 application and offers both terminal emulation and file transfer for communicating with IBM mid-range hosts.

The IDEAcomm 5251 for Windows lets IBM Personal System/2s and Personal Computers emulate IBM 5250-type terminals supported by Application System/400, System/36 and System/38 hosts. It includes a version of IDEA's IDEAlink file-transfer software that users can access directly from Windows.

IDEAComm 5251 is scheduled to be available in September for $395.

IBM bolsters line of X.25 offerings for PS/2s, FEPs

Licensing deal turns PS/2s into packet switches.

By Paul Desmond
Senior Editor

NEW YORK — IBM recently unveiled products that beef up its suite of X.25 offerings, including a licensing agreement for software that turns IBM Personal System/2s into packet switches.

The vendor also announced an enhancement to X.25 SNA Interconnection (XI) that enables the front-end processor-based X.25 package to automatically reroute virtual circuits in case of failure.

IBM said it will license packet-switching software for PS/2s from Amnet, Inc. of Framingham, Mass. Dubbed X25Net Switch, the software lets users build private X.25 networks of virtually any size.

"Basically, you've got a self-healing, high-availability, low-cost, high-performance net offering using the full range of PS/2 platforms," said Roger Smith, a product manager in IBM's Networking Systems group.

Using standard IBM Real-Time Interface Co-processor (RTIC) cards to expand the number of ports available on a PS/2, users can create nodes ranging from eight ports on a single PS/2 to 192 ports on a cluster of PS/2s, Smith said. The switch supports links of up to 19.2K bit/sec for RS-232 devices and up to 256K bit/sec for X.21, RS-422 and V.35 connections on either the trunk or local side.

X25Net Switch nodes are self-defining, meaning users configure each node independently but do not have to update other nodes when adding or deleting a node from the network. The product automatically computes the route of least delay across the network and supports the automatic rerouting of packets around a failed node, provided an alternate path is available.

To manage X25Net Switch networks, IBM will offer the IBM X25Net Manager product. It provides a graphical representation of the network and can be configured as a service point to provide a bidirectional link to NetView.

Both products are scheduled for availability in December. X25Net Switch software ranges in price from $6,000 to $30,000, depending on usage level. X25Net Manager costs $26,000, which includes RTIC cards and OS/2 Extended Edition.

The XI Version 2 Release 3 is a new release of the IBM front-end processor software that encapsu-

(continued on page 14)

HP pitches RISC servers, serves up Telnet support

By Timothy O'Brien
West Coast Bureau Chief

PALO ALTO, Calif. — Hewlett-Packard Co. last week unveiled 16 aggressively priced high-performance workstations and servers, which it claims far outperform comparable IBM and Digital Equipment Corp. products.

HP also announced new network software that provides users with remote access to HP systems and to any vendor's host supporting the Telnet terminal protocol.

The new additions to the HP 9000 and HP 3000 lines outperform comparable IBM and DEC gear by as much as six times, the company said. The new computers can be used as multifunction servers or dedicated network servers for applications, data bases and communications tasks.

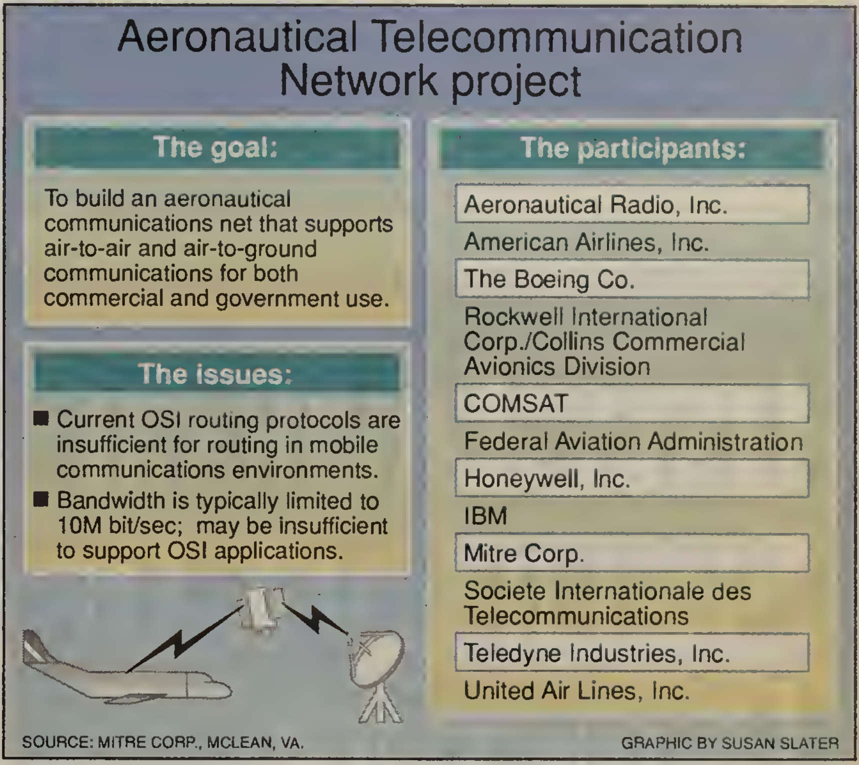
HP is gearing the products — which are based on the company's Precision Architecture Reduced Instruction Set Computer technology used previously in HP's minicomputer lines — to network managers who are downsizing applications and networks from large host-based systems to distributed processing networks.

"There is a new generation of [information systems] managers that is less loyal to IBM and is making decisions based on data bases and software that drive the business," said Bernard Guidon, general manager of HP's General Systems Division. "With a shift to networks and open systems, HP is positioned for this change."

HP said its new low-end systems deliver six times the performance of IBM's recently introduced Application System/400 entry-level systems and DEC's VAX 3100s. The new mid-range HP 3000 system costs half as much as the IBM AS/400 and DEC VAX 6500 yet offers the same performance, according to HP.

In addition, the company said

(continued on page 14)



Aeronautical Telecommunication Network project

The goal:

To build an aeronautical communications net that supports air-to-air and air-to-ground communications for both commercial and government use.

The issues:

- Current OSI routing protocols are insufficient for routing in mobile communications environments.
- Bandwidth is typically limited to 10M bit/sec; may be insufficient to support OSI applications.

The participants:

Aeronautical Radio, Inc.
American Airlines, Inc.
The Boeing Co.
Rockwell International Corp./Collins Commercial Avionics Division
COMSAT
Federal Aviation Administration
Honeywell, Inc.
IBM
Mitre Corp.
Societe Internationale des Telecommunications
Teledyne Industries, Inc.
United Air Lines, Inc.

SOURCE: MITRE CORP., MCLEAN, VA.

GRAPHIC BY SUSAN SLATER

OSI limitations may ground airline net

Lack of sufficient routing protocols, bandwidth issues loom as obstacles to net for flight data.

By Ellen Messmer
Washington Correspondent

VIENNA, Va. — The lead engineer in charge of an effort to build an OSI-based mobile network for airline flight data recently said the effort has hit several snags that may prevent it from ever getting off the ground.

Forrest Colliver Jr., lead engineer at Mitre Corp.'s civil systems division, said current Open Systems Interconnection specifications lack sufficient routing protocols for the Aeronautical Telecommunications Network (ATN), which was conceived to support air-to-air and ground-to-air data traffic.

Furthermore, the limited bandwidth available in subfrequency ranges may also prove a formidable hurdle for the ATN project.

Colliver said ATN project members must create a new routing protocol for low-speed mobile systems before the network can become a reality.

The civil aviation community has begun developing ATN, a new generation of aircraft and ground control systems for both government and commercial use. Likely to be the world's largest OSI network, ATN is planned for full deployment by 1995.

Colliver said the project's members recently determined that OSI routing protocols available today are unsuitable for the mobile communications ATN environment.

"Neither the Inter-Domain Routing Protocol nor the [Integrated] Intermediate System to Intermediate System routing protocols truly support mobile routing," Colliver said.

International Standards Organization protocols are suited for transmitting data between fixed points in a typical office environment. But for the ATN mobile environment, "The key is to be able to integrate satellite and VHF data technologies," Colliver said. "There is a lack of protocol commonality and end-to-end connectivity across diverse fixed and mobile networks."

The limited bandwidth in some mobile radio frequency networks — typically in the 10K bit/sec range — has also proven problematic, Colliver said during the Technology Transfer Institute's Interoperability Challenge conference held here recently. The lack of sufficient bandwidth could become an issue as project participants try to transmit large blocks of OSI data.

In an effort to resolve the conflicts, the ATN consortium (see graphic, this page) has decided to adopt the ISO's Inter-Domain Routing Protocol and adapt it for mobile use, Colliver said.

The development of the protocol is a major task. "The consortium is forced to go out and develop it itself," Colliver said.

ATN participants initiated the project in 1989 with seed money from the federal government, but the participants themselves are the main investors in the project, Colliver said. They will build the hardware and software driving the next-generation aircraft com-

(continued on page 14)

HP pitches RISC servers

continued from page 13

its new HP 9000 Series 800 provides 50% to 100% better price/performance than IBM's RISC System/6000 models.

"This announcement shows that not only is HP back in the ball game, they're taking a leadership position," said Rikki Kirzner, senior industry analyst at Dataquest, Inc. in San Jose, Calif. HP now has the best price/performance systems in the industry, she added.

Some of the new systems will be available next month, while the remaining introductions will continue through October. Prices for these systems range from $12,895 to $170,000.

The new HP OpenView Datacommunications and Terminal Controller (DTC) Manager Release 10.5 software is an OpenView application that runs on an IBM, HP or Compaq Computer Corp. personal computer. The software monitors and controls DTCs.

Version 10.5 of the software enables DTC Manager to instruct a DTC to support the Telnet protocol. This, in turn, allows the DTC to communicate over a Transmission Control Protocol/Internet Protocol local- or wide-area network with any vendor's host that also supports Telnet.

HP OpenView DTC Manager Release 10.5 costs $1,500 and should be available shortly. ◻

OSI limitations may ground net

continued from page 13

munications systems used for sending and receiving inflight navigation data.

In the first phase of ATN, the consortium is striving to have aircraft and ground systems interoperating by mid-1993. In the second phase, ATN will provide full dynamic routing by 1995.

"We have a significant certification issue looming ahead," Colliver said. He noted that the system must be approved by the appropriate aviation certification authorities.

But in the foreseeable future, the ATN improvements are likely to be part of new aircraft, such as The Boeing Co.'s modified 747 and new 777, which should have far more advanced local networking on board, Colliver said.

Despite the hurdles that lie ahead, the ATN consortium is nearing agreement on the application layers for the network's design.

"This is a connectionless network modeled on the Defense Advanced [Research] Projects Agency Internet," he said.

Colliver noted that the group's debate over the benefits of the ISO Connectionless Network Service (CLNS) vs. the Connection-Oriented Network Service was resolved in favor of CLNS because it offers link diversity among a variety of routing domains.

The upper layers of the net design, however, are still subject to discussion among the group.

Collier pointed out that there is a lot of resistance to OSI applications on the upper layers due to possible bandwidth constraints. "But we're making progress," he said. ◻

IBM bolsters X.25 offerings

continued from page 13

lates X.25 packets in Systems Network Architecture frames so they can be carried across an SNA backbone.

New with that release is Automatic Route Recovery, which lets all virtual routes on a failing physical link be automatically switched to an alternate link without disrupting user sessions, Smith said.

The release also supports a new Fast Select facility, which allows users to send X.25 data without going through the usual procedure of sending call request and call acceptance packets. Instead, data can be included in the call acceptance packet.

XI Version 2 Release 3 is scheduled for availability in September for MVS and in October for VM hosts. Onetime charges range from $15,720 to $28,805, depending on usage level. The basic upgrade charge from most previous versions is $780. ◻

ONLY THROUGH SHEER LACK OF DEDICATION,

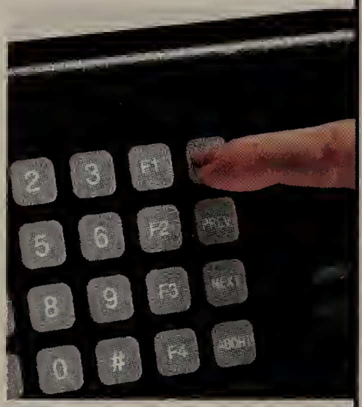
FRACDIAL™ BRINGS YOU...

Affordable,
Dial-up,
1.344 Mbps,
Data Transmission

Sometimes dedication just gets in the way. That's why we created **Fracdial.** Now you no longer need dedicated T-1 lines for high speed, high quality data and image transmission.

Available today, **Fracdial** works with all digital carrier networks, switches, and your current equipment, as well as most digital PBXs. What's more, anyone can operate **Fracdial** — it's push-button easy!

Fracdial automatically dials multiple *non-contiguous* circuits across any digital network — public or private. It divides your data among these circuits and then synchronizes them at the other end into a single stream of data at any bit-rate you want. Up to 1.344 mega-bits per second.



Fracdial is push-button easy.

Fracdial has already found wide application. Hospitals use it to transmit diagnostic quality radiology images. Major corporations use **Fracdial** to connect their local area networks. And, **Fracdial** has made real-time, high quality video conferencing more widely available and affordable than ever. Plus it's the perfect solution for backing up your critical T-1 lines.

Has dedication blocked your communications capabilities? Call, write, or fax today, and see what **Fracdial's** lack of dedication can do for you.

DIGITAL ACCESS

11501 SUNSET HILLS ROAD, SUITE 200
RESTON, VIRGINIA 22090
IN VA: (703) 471-5010
TOLL FREE: 1-800-666-2325
FAX: (703) 471-4848

Fracdial is a trademark of Digital Access Incorporated

See the Action Center for
networking products & services!

Use the Action Center Reader Service Card
and get free information
on networking products & services.

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

"Novell [Inc.] support has been abysmal. They haven't really helped us a lot. We're hoping IBM will be better. At least with IBM, we have some leverage."

Paul Steele
Manager of PC Technology
Executive Office of the President
Washington, D.C.
Talking about the primary benefit of the IBM/Novell agreement for his users.

Netnotes

3Com Corp. last week released Simple Network Management Protocol-based network management software to manage its line of network products. 3Com's ViewBuilder runs on OS/2 platforms and provides a graphical user interface in which network devices are represented by icons.

The software is designed to provide cable fault detection and correction, as well as performance and configuration management for 3Com's LinkBuilder wiring hubs, NetBuilder bridges and routers and CS/2000 and CS/2100 terminal servers. ViewBuilder is currently available and costs $3,995.

Gateway Communications, Inc. last week reduced the prices of its 10BaseT Ethernet hub products. The G/EtherTwist AT Hub Adapter, a combination Ethernet adapter card for AT bus microcomputers and four-port 10BaseT hub, has been reduced in price from $800 to $495.

The G/EtherTwist AT Hub Expander, a four-port expansion kit for the hub, has been reduced from $400 to $300.

Engage Communication, Inc. of Aptos, Calif., has released an Apple Computer, Inc. AppleTalk router that features an integrated data service unit, providing connections to wide-area digital

(continued on page 16)

Enhanced TCP/IP packs get support for Windows, SMTP

Wollongong also updates NFS package for VMS.

By Eric Smalley
Senior Editor

PALO ALTO, Calif. — Wollongong Group, Inc. has introduced Version 2.0 of its Transmission Control Protocol/Internet Protocol software for microcomputers and Version 5.2 of its TCP/IP software for Digital Equipment Corp.'s VMS systems.

PathWay Access 2.0, available for DOS, OS/2 and Apple Computer, Inc. Macintosh microcomputers, now supports Microsoft Corp. Windows 3.0 and TCP/IP's File Transfer Protocol and Telnet terminal-to-host access protocol as native Windows applications.

The software includes support for DEC VT and IBM 3270 terminal emulation. In addition, it includes scalable fonts that adjust automatically to different window sizes.

PathWay Access 2.0 supports as many as 25 concurrent sessions, depending on the available memory. The software coexists with network operating systems and allows sharing of data between systems on different networks, the company said.

The software will be available next month and will cost $395 for a single-user license.

Release 5.2 of WIN/TCP for VMS adds support for Pony Express, a message transfer agent that supports the Simple Mail Transfer Protocol (SMTP), VMS Mail, All-In-1 and the Unix-to-Unix Copy Program.

Release 5.2 also adds support for a dual command line interface, allowing both Unix and VMS Digital Command Language syntax for most applications, the company said.

With Release 5.2, several options have been bundled into the basic WIN/TCP for VMS product, including Dbridge for remote connections, an All-In-1 Mailbus-to-SMTP gateway and Serial Line Internet Protocol.

Wollongong also released Version 2.0 of its PathWay Server NFS for VMS, doubling the product's performance, the firm said. The product, sold as an option for WIN/TCP for VMS, allows VMS systems to act as file and print servers to microcomputers supporting the Network File System.

Version 5.2 of WIN/TCP for VMS is currently available and costs from $1,000 to $40,000, depending on the CPU. PathWay Server NFS is also available and costs from $1,000 to $11,000, depending on the CPU.

Both products are sold and supported by DEC as well as Wollongong. ◾

Fibermux unveils Ethernet bridge module for TDM

By Caryn Gillooly
Senior Editor

CHATSWORTH, Calif. — Fibermux Corp. last week brought out a new Ethernet bridge for its Magnum 100, a time-division multiplexer (TDM) chassis used to interface voice, data and local-area network devices in a proprietary 100M bit/sec fiber-optic backbone network.

The new bridge module — the CC8875Z — will enable users to keep Ethernet traffic from various departmental LANs off the backbone, unlike the Ethernet repeaters the company currently offers, which forward all packets across the net, regardless of whether they are destined for a local device.

"By separating LANs [with a bridge], you can get more predictable performance on each segment," said John Reidy, Magnum 100 product manager at Fibermux, based here. "You can create work groups with higher performance locally, then transport information from one work group to another. Local traffic is then kept local and does not interfere with the backbone traffic."

Magnum 100 networks are created by installing chassis at multiple sites and linking them via fiber in a ring topology. The Magnum hubs use the TDM to assign transmission time slots to individual data, voice and video channels. Each channel, therefore, can use the entire bandwidth of the transmission pipe.

In addition to the Ethernet bridge module, Fibermux offers 10 other modules for the Magnum 100 chassis, including token ring, Apple Computer, Inc. AppleTalk, ARCnet, IBM 3270, T-1 and RS-232 repeaters.

According to Reidy, each Ethernet bridge can connect to as

(continued on page 16)

Macintosh-to-LAN link trends

	1990	1993*	1995*	CAGR (1990 to 1995)
Shipment growth:				
Macintosh Ethernet	87%	70%	25%	61%
LocalTalk	30%	-15%	-22%	-13%
Installed base growth:				
Macintosh Ethernet	124%	83%	50%	79%
LocalTalk	53%	4%	-12%	4%
Average price:				
Macintosh Ethernet	$431	$230	$160	-18%
LocalTalk	$54	$29	$20	-14%

*1993 and 1995 figures are estimated.
CAGR = Calculated annual growth rate

GRAPHIC BY SUSAN J. CHAMPENEY
SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Mac network surge boosted by Ethernet

High levels of Mac connectivity aided in early stages by AppleTalk, but users now want more.

By Caryn Gillooly
Senior Editor

Apple Computer, Inc. Macintoshes are quickly moving into mainstream network environments, a trend that will be fueled by user migration from Apple's LocalTalk to Ethernet local-area networks, according to a recent study.

The study by Framingham, Mass.-based International Data Corp. (IDC) shows that Macintoshes are already more networked than personal computers. More than 65% of all business Macintoshes were connected to LANs in 1990, while only 33% of all business personal computers were LAN-attached. By 1995, IDC predicts almost 74% of all Macintoshes in business environments will be networked.

The reason that networking has been popular with Macintoshes to date is that they come with built-in LocalTalk interfaces that provide plug-and-play capabilities, unlike personal computers, which require additional adapter boards.

The shift to Macintosh will continue, however, for three primary reasons: Apple's commitment to Ethernet, other vendors' commitment to Macintosh Ethernet products and the speed limitations of LocalTalk.

In January, Apple announced its FriendlyNet line of Ethernet adapters, the design of which "anticipates the inclusion of Ethernet on the motherboard of future Mac CPUs," according to the IDC study. IDC believes Apple's 68040-based microcomputers and Reduced Instruction Set Computer workstations will be the first machines to get motherboard Ethernet interfaces.

The study predicts that these machines will be positioned as servers and will be available sometime between 1992 and 1994. With this forecast, and IDC's prediction that Apple will ultimately offer optional onboard Ethernet interfaces for its mid-range microcomputers, the study estimates Macintosh Ethernet connections will surpass Macintosh LocalTalk connections by 1994.

By 1995, IDC predicts 74% of Macs in business environments will be networked.

▲▲▲

A second factor in the shift will be the entrance of other vendors in the Macintosh Ethernet arena.

"What's interesting about this is that there are almost two sets of vendors," said Susan Frankle, senior analyst in IDC's LAN program. "You have the traditional Ethernet suppliers that have been supplying Ethernet cards for all types of machines — including Macs — in a heterogeneous environment, and now [you have] the Mac-specific suppliers that sell into homogeneous Macintosh environments."

Traditional Ethernet adapter card vendors, such as Cabletron Systems, Inc., Racal InterLan, Inc. and 3Com Corp., will begin to see stiff competition from

(continued on page 16)

Netnotes

continued from page 15

services. The SyncRouter/LTi connects to an AppleTalk network and to 56K bit/sec digital data service networks, allowing remote AppleTalk local-area networks to be linked.

The SyncRouter/LTi is currently available and costs $2,495.

Hayes Microcomputer Products, Inc. has announced a high-end modem that can operate at 38.4K bit/sec and includes an X.25 packet assembler/disassembler. The V-series Ultra Smartmodem 14400 includes CCITT V.32 and V.42 interfaces for line speeds of 14.4K and 38.4K bit/sec, respectively.

The Ultra Smartmodem 14400's X.25 PAD supports as many as four simultaneous sessions. The modem will be available in August for $1,199. Upgrades from Hayes' Ultra 96 modem will cost $275.

Connectivite Corp. of Tarrytown, N.Y., has announced the next version of its software that allows users to build front-end applications on Apple Computer, Inc. Macintoshes for controlling applications on IBM mainframes. The software, called Both, lets Macintosh end users manipulate mainframe applications using the Macintosh icon-based graphical user interface.

With Version 2.0, users will be able to perform postprocessing and local data manipulation to support the back-end mainframe applications.

Version 2.0 will be available later this month for $3,100.

Xircom, Inc. has released an external IBM 3270 adapter for microcomputers. The Pocket 3270 Adapter connects to desktop or portable IBM-compatible microcomputers through the parallel port. The adapter, which comes with 3270 emulation software from Microcom, Inc., connects to an IBM 3274 or 3174 local control unit via a coaxial cable connection. The Pocket 3270 Adapter, when bundled with Microcom's Relay Gold for DOS, costs $745. When bundled with Microcom's Relay Gold for Windows, it costs $795.

Avatar Corp. of Hopkinton, Mass., has announced two token-ring adapter cards for Apple Computer, Inc. Macintosh computers. The two MacMainframe 16/4 MB Token Ring cards, which can be switched between 16M and 4M bytes, are used with Avatar's MacMainframe Token Ring Workstation and MacMainframe Token Ring Gateway software products.

MacMainframe Token Ring Workstation gives Macintosh users IBM 3278 and 3279 terminal emulation, and 3287 printer emulation. MacMainframe Token Ring Gateway provides up to 64 3270 sessions. The token-ring adapter cards will be available in the third quarter. An adapter card bundled with the MacMainframe Token Ring Workstation software costs $1,395. The other adapter card, bundled with the MacMainframe Token Ring Gateway software, costs $2,495 for an eight-session license, $4,495 for a 32-session license and $6,495 for a 64-session license. ☒

Fibermux unveils Ethernet module

continued from page 15

many as eight additional bridges, either over the backbone or distributed locally.

When asked if the Magnum 100 chassis or backbone supports the Fiber Distributed Data Interface, Reidy said, "No, this doesn't do FDDI. Our technology is in competition with FDDI. With FDDI, you can't do T-1 or digitized video. Ours can."

Reidy added, however, that the company does offer FDDI products and is actively involved in the FDDI standardization committees.

The Magnum 100 bridge module is available now for $3,950. ☒

Mac network surge boosted by Ethernet

continued from page 15

Asante, Farallon Computing, Shiva Corp. and other companies that have made their mark by selling only to the Macintosh world.

In fact, according to the study, Asante is currently the second largest supplier of Macintosh Ethernet cards, responsible for more than 19% of worldwide shipments in 1990. The company only entered the market in 1989.

One of the other primary factors for the shift from LocalTalk to Ethernet is network speed. LocalTalk operates at 256K bits/sec, which, according to the study, is sufficient for small Macintosh networks with simple file- and print-sharing needs.

However, as Macintoshes are integrated into mission-critical environments and called on to run more sophisticated applications, the bandwidth of LocalTalk proves to be limited. Users will turn to 10M bit/sec Ethernet and even 4/16M bit/sec token ring for additional bandwidth.

LocalTalk then, although not quite dying, will play an increasingly niche role, according to the study.

"As the number of Macs per LAN grows over the next several years, and as the applications running across these networks become increasingly sophisticated, IDC believes that LocalTalk will sell only at the low end of the Mac-oriented networking market," the study stated. "LocalTalk technology, therefore, will . . . remain . . . in Mac-dominant, extremely price-sensitive environments with low-bandwidth demands." ☒

1975 *Launched the first U.S. public data network.* 1979 *Built the first commercial private packet network.* 1980 *Introduced the first major public e-mail service.*

1988 *Sprint completes the only nationwide 100% digital fiber optic network. Sprint awarded 40% of FTS 2000 contract.* 1989 *World's first and largest privately-owned*

Stanford U. makes the move from mainframes to Unix workstations

By Timothy O'Brien
West Coast Bureau Chief

STANFORD, Calif. — Hamlet is dead. So are Othello and Lear. Macbeth will die today.

At Stanford University, four mainframes collectively called "the four tragedies" are being replaced by a network of Unix workstations and Apple Computer, Inc. Macintoshes that will serve the school's student and instructional computing requirements.

"We're getting out of the time-sharing business in favor of distributed computing," explains Ralph Gorin, a director in the Library and Information Resources (LIR) department at the university.

The mainframes, named after characters from Shakespeare's great tragedies — Hamlet, Othello, Lear and Macbeth — have been in place since the mid-1980s. LIR is dismantling the last of the mainframes today and is redirecting students to the new workstations.

The new network is based on Macintoshes as well as workstations and servers from Digital Equipment Corp., IBM, NEXT, Inc. and Sun Microsystems, Inc.

Departmental local-area networks are linked via the Transmission Control Protocol/Internet Protocol to the university's backbone network. LIR has direct fiber or coaxial connections between its various locations on campus.

Through the use of graphical interfaces, students are shielded from the complexities of the Unix environment and network functions. A variety of applications is available on the network, ranging from word processing to programming and computer-aided learning programs.

Since all workstations run some form of Unix, students will retain access to USENET, a public network allowing messages to be shared nationwide. USENET provides access to bulletin boards, a public forum in which students can actively participate.

Due to the messaging capability and access to stored data, Gorin anticipates that the workstations will grow in popularity. Currently, hundreds of workstations and computers are available to students and faculty free of charge at the school's libraries and other campus locations.

Exit, stage left for LOTS

Student computing began at the campus in 1976, when John McCarthy, the professor of computer science who coined the term "artificial intelligence," decided students needed their own computers. With one DEC 2040, McCarthy created a department called the Low Overhead Timesharing System (LOTS).

"Almost from the beginning, LOTS was more successful than we could handle," Gorin admitted. Although the LOTS computers served students and faculty for 14 years, "We knew they were going to suffer an early and tragic death." ◘

1985 *Sprint introduces the world's first VPN.*℠ 1986 *First transcontinental fiber optic call transmitted by Sprint.* 1987 *Eight million FŌNCARDs*℠ *distributed in first year.*

MADE FOR PREVENTING THEM.

Let's face it. There's no way you can stay competitive if your entire data network goes down. That's why you should take a close look at Sprint.®

Because our entire network was made to maximize uptime. It has 100% digital switches. And 100% fiber optic transmission. Nationwide. Along with built-in redundancy to protect critical data. Maybe that explains why we had no interruptions during Hurricane Hugo. Or the 1989 San Francisco earthquake.

So if your data means as much to you as we think it does, call us at 1-800-800-1517. We'll have detailed information in your fax machine in minutes. And we'll show you the right way to send data. On a network that was literally made for it.

Sprint.
Made for data.℠

© 1991 US Sprint Communications Company Limited Partnership. © 1991 King Features Syndicate, Inc. ™ of The Hearst Corporation.

transatlantic fiber optic cable completed. 1990 *Sprint announces the first commercial video services to the Soviet Union. Sprint introduces first nationwide ISDN capabilities.*

LAN Auditor expanded to support VINES

By Eric Smalley
Senior Editor

Horizons Technology, Inc. has released Version 2.0 of LAN Auditor, its local-area network inventory and configuration monitoring software.

Version 2.0 adds support for networks running Banyan Systems, Inc. VINES, Microsoft Corp. LAN Manager and Novell, Inc. NetWare. Horizons has also added a Microsoft Windows 3.0-compatible user interface to the new LAN Auditor version, in addition to its original DOS interface.

LAN Auditor collects network information about the hardware and software installed on workstations. The product creates and updates a data base automatically when changes are made to workstation configurations, according to company officials.

> Horizons added a Windows 3.0-compatible user interface.
>
> ▲▲▲

Version 2.0 collects new information, such as available memory, types of input devices installed, bus type, machine class, video memory, hard disk partitioning, AUTOEXEC.BAT and CONFIG.SYS file information and CPU clock rate.

LAN Auditor Version 2.0 is currently available and costs $495 for a 50-workstation license. Tracking additional workstations costs $295 per 100 nodes. Upgrades from Version 1.0 cost $99.

Horizons can be contacted at 3990 Ruffin Road, San Diego, Calif. 92123, or by calling (619) 292-8320. ◘

The body of a laptop.
The heart and soul of a PS/2.

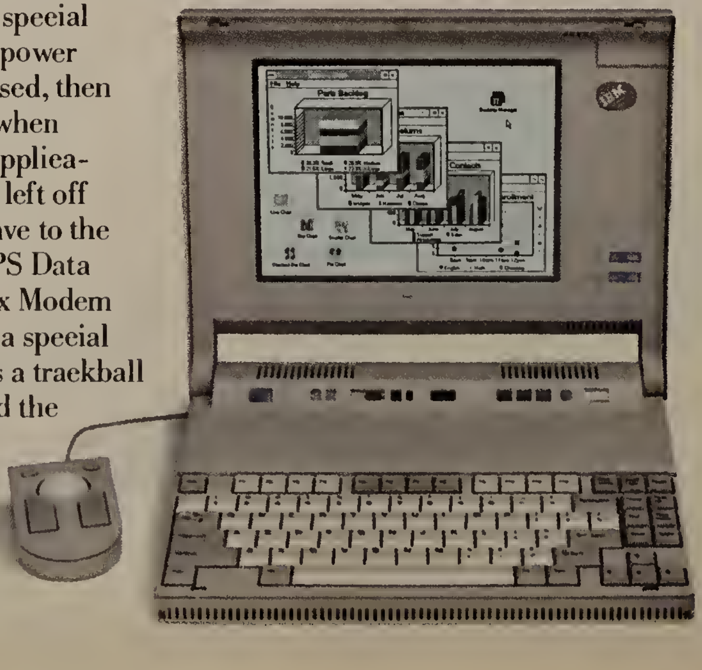
INTRODUCING A PS/2 LAPTOP THAT'S FULL OF FEATURES. NOT COMPROMISES.

Making a computer light enough to take anywhere and small enough to sit on a lap isn't enough. Making it perform like one that sits on a desk is the true challenge. That's why IBM has created a computer that delivers true portability without sacrificing true performance—the Personal System/2® Laptop 40 SX. At just 7.7 pounds it's clearly a lightweight computer. But it certainly doesn't act like one.

The PS/2® Laptop looks great from the outside. But its true beauty lies inside, where you'll find uncompromised computing power. It has the same 386SX™/20 MHz processor found in best-selling desktop models. A 3.5″ 1.44MB disk drive and 2.5″ 60MB fixed disk provide fast access to programs and data, and standard 2MB RAM is expandable to 18MB.

Instead of compromising comfort by altering the keyboard, the PS/2 Laptop has a full-size keyboard spaced and arranged the same way as a desktop PS/2's. And instead of squeezing information onto a pint-size screen, it has a sidelit LCD that offers a 10″-diagonal viewing area. It delivers sharp, clear text and graphics with VGA quality. The PS/2 Laptop also has system status icons that monitor assorted functions and battery life. Extensive power management controls include the ability to change batteries in the middle of an application without exiting and a special feature that suspends power when the screen is closed, then returns to full power when reopened, resuming applications where they were left off without the need to save to the hard drive. A 2400 BPS Data Modem/9600 BPS Fax Modem is available, as well as a special mouse that doubles as a trackball when turned over. And the PS/2 Laptop comes with something no laptop should be without—an international warranty* backed by thousands of Authorized Remarketers worldwide, so service and support are never far away.

To find out more, contact your IBM Authorized Remarketer or IBM marketing representative. You'll see why with the new PS/2 Laptop, you don't need a whole lot of room to get a whole lot of computer.



How're you going to do it?

PS/2 it!

IBM®

---

*Available only in the countries in which this product is sold by IBM and IBM Authorized Remarketers. Subject to the terms of the limited warranty provided when purchased. Proof of original purchase may be required. IBM, Personal System/2 and PS/2 are registered trademarks of International Business Machines Corporation. 386SX is a trademark of Intel Corp. © 1991 IBM Corp

Why Would A Large Insurance Company Need Our Help To Avoid Disaster?

The Answer Lies Buried In This Ad.

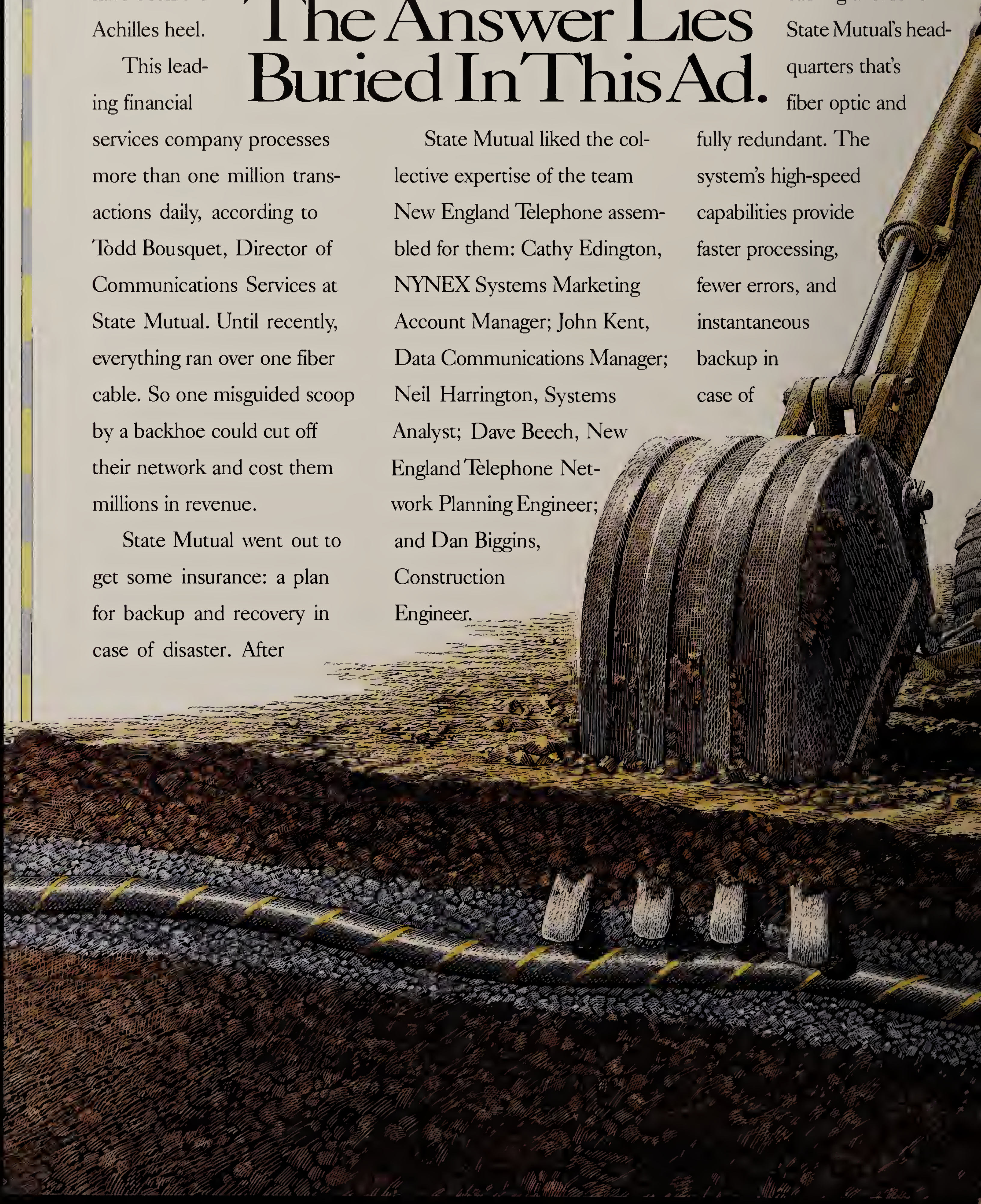
The State Mutual Companies' telecommunications network was their lifeline. And could have been their Achilles heel.

This leading financial services company processes more than one million transactions daily, according to Todd Bousquet, Director of Communications Services at State Mutual. Until recently, everything ran over one fiber cable. So one misguided scoop by a backhoe could cut off their network and cost them millions in revenue.

State Mutual went out to get some insurance: a plan for backup and recovery in case of disaster. After evaluating several proposals, they chose to work with New England Telephone.

State Mutual liked the collective expertise of the team New England Telephone assembled for them: Cathy Edington, NYNEX Systems Marketing Account Manager; John Kent, Data Communications Manager; Neil Harrington, Systems Analyst; Dave Beech, New England Telephone Network Planning Engineer; and Dan Biggins, Construction Engineer.

They designed a system that addressed every facet of State Mutual's needs: a second cabling access to State Mutual's headquarters that's fiber optic and fully redundant. The system's high-speed capabilities provide faster processing, fewer errors, and instantaneous backup in case of



failure. So it gave State Mutual the protection it needed, plus a competitive edge any business needs today.

Faster processing with no down-time gives State Mutual the ability to stay close to their customers – to respond quickly and surely every time they're needed – which is exactly what State Mutual's corporate strategy calls for.

"We live or die by the phone, so making it better is critical to our success," Mr. Bousquet said. And our new backup and recovery system gave him just what State Mutual wanted.

Including 24-hour network surveillance to head off trouble before it hits.

To dig up some facts on how our network expertise can help your business, call your NYNEX Systems Marketing account executive, your authorized New England Telephone sales agent, or call us directly at 1 800 346-8809, ext. 349.

Network know-how that runs deep. Another reason we're the one for you, New England.

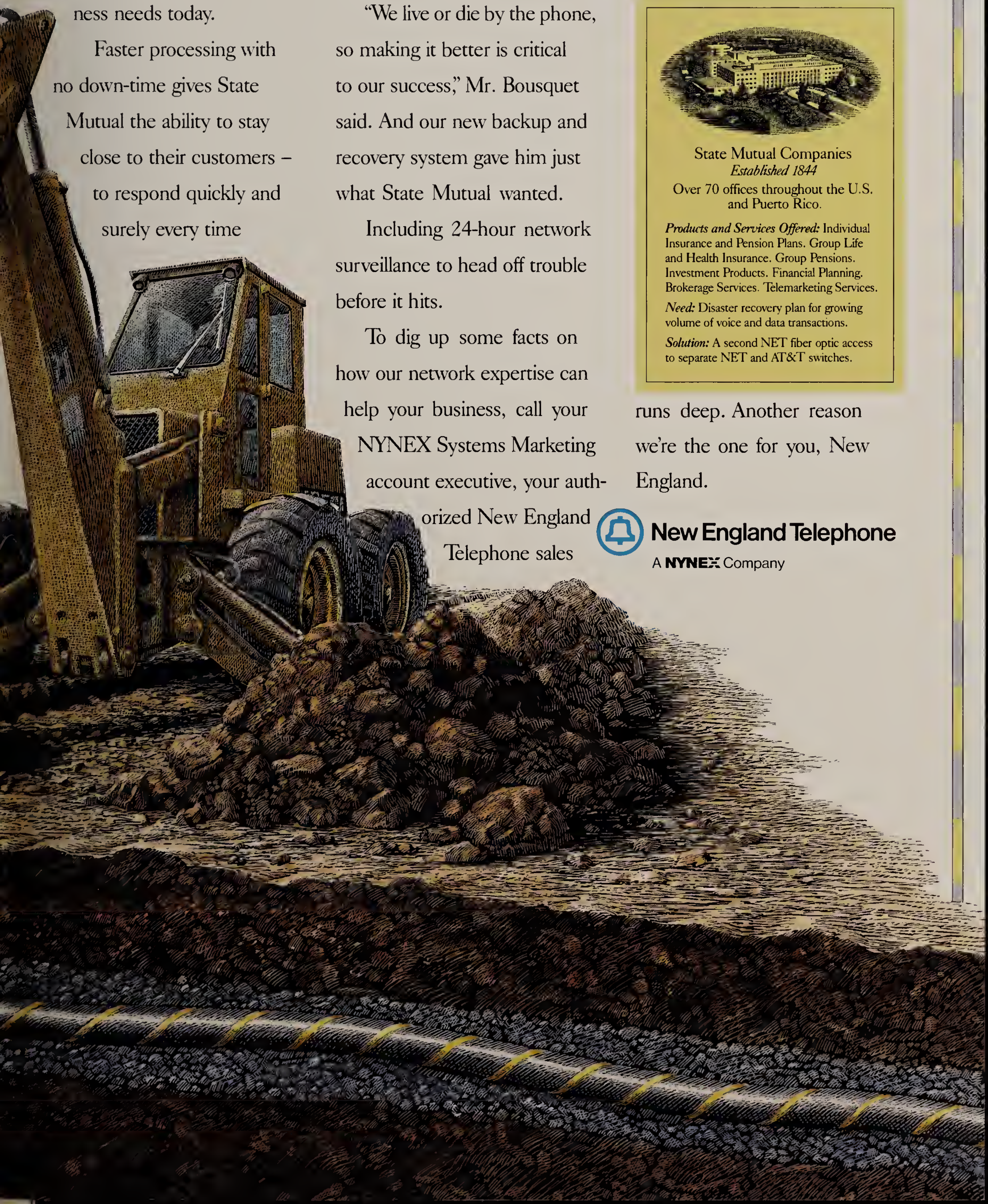
State Mutual Companies
Established 1844
Over 70 offices throughout the U.S. and Puerto Rico.

Products and Services Offered: Individual Insurance and Pension Plans. Group Life and Health Insurance. Group Pensions. Investment Products. Financial Planning. Brokerage Services. Telemarketing Services.

Need: Disaster recovery plan for growing volume of voice and data transactions.

Solution: A second NET fiber optic access to separate NET and AT&T switches.

New England Telephone
A **NYNEX** Company



To dig up more facts on our networking capabilities, call your NYNEX Systems Marketing account executive, your authorized sales agent, or call
1 800 346-8809, extension 349.

New England Telephone
A **NYNEX** Company

Call New England Telephone or one of our authorized sales agents • Executone Information Systems (Boston) 1 800 852-3122 Network Research and Control, Inc. 1 800 445-4541 • AIM Telephones of New England, Inc. 1 800 CALL AIM • US TeleCenters (617) 439-9911, 1 800 441-3211 • Computer Telephone Corporation (617) 466-8080, 1 800 225-3288 • Telenetwork Services, Inc. (401) 434-9000, 1 800 525-0032 • COMLINK Network Services 1 800 428-2212 • Community Telecommunications Corp. within ME 1 800 522-3993 • Network Services Corp. 1 800 442-5221 • Eastern Telecom, Inc. 1 800 535-1068

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Dialogue

Should the user or the carrier be liable for unauthorized calling charges in cases of private branch exchange fraud?

“There's no black-and-white answer. But much of the onus must be placed on the user to take precautionary measures to prevent hackers from tapping into their switches.

“There's a tremendous amount of hacking going on, and users should be aware of the extent of the problem.

“If the carrier manufactures a PBX and markets it as fraud-proof, then the user might have a case for saying the carrier is responsible for any fraudulent charges. But I can't imagine any carrier making that claim because no system is impenetrable.”

Thomas Festa
President
Wall Street
Telecommunications
Association
New York

“If toll fraud resulted from the faulty design of the PBX, then you can obviously hold the vendor responsible. But that's extremely difficult to prove.

“If carriers are going to start being held responsible in the majority of cases, it's going to result in higher priced services. So there's no escape — the user always pays.”

Robert Bursick
Director of
Telecommunications
Wayne State University
Detroit

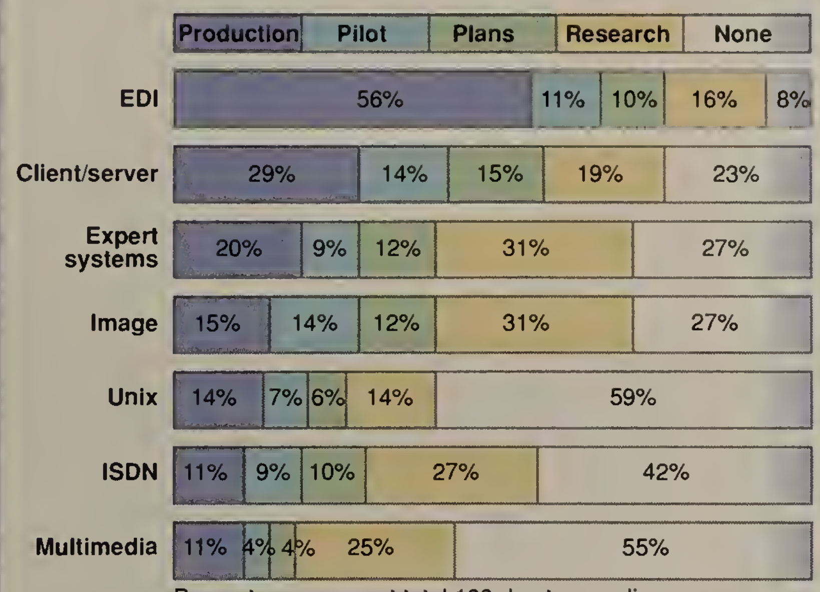
“The ideal situation would be to hold the hackers responsible, but unfortunately, there doesn't seem to be enough interest in tracking them down and prosecuting them.

“There's got to be mutual responsibility between users and carriers. All systems are vulnerable to one extent or another. The carriers do well in trying to ensure the PBX is as secure as possible. But they can't give absolute guarantees. Users have tools to monitor the usage of their trunks, and if they're really doing their job, they'll check daily for abnormal usage and thwart the fraud attempts early on.”

Phillip Evans
Director of
Telecommunications
FMC Corp.
Dallas

Software development turns toward networking

New systems being deployed by large users:



Percentages may not total 100 due to rounding.

Figures are based on a survey of 145 systems development managers at companies with average annual revenue of $4.1 billion.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: CSC INDEX, INC.'S "SURVEY OF SYSTEMS DEVELOPMENT DIRECTORS"

Users struggle to develop new network applications

Report criticizes aging development methods.

By Wayne Eckerson
Senior Editor

CAMBRIDGE, Mass. — Software developers at large user companies must redesign their development processes and methodologies if they are to keep pace with the demand for network applications and distributed systems, according to a recent report by CSC Index, Inc., based here.

Developers remain entrenched in a mainframe world and have been reluctant to embrace new tools and methodologies that would increase their productivity, the report states. As a result, most systems development groups continue to struggle to complete projects on time and within budget.

“Systems development must step up to the plate and reengineer their own skills and work processes if they are to do the same for others,” said James Champy, chairman and chief executive officer of CSC Index, an information technology management consulting firm.

The second annual “Survey of Systems Development Directors” was conducted by CSC Index, a subsidiary of Computer Sciences Corp., and sponsored by more than 60 major corporations. The report was based on a survey of 142 systems development directors in large U.S. companies representing a cross-section of industries.

The survey asked systems development directors to rank the most critical issues they will face in the coming year and comment on the techniques, tools and human resources issues affecting system development operations at their companies.

By far, directors are most concerned about speeding the delivery of applications to end users. Increasing developer productivity topped the list of critical issues, rising four notches in the ranking since last year's survey.

To boost productivity, directors are implementing total quality programs, streamlining departments by removing management layers and revamping training and career paths.

But the survey indicates that directors face a host of obstacles in their efforts to improve productivity. One significant obstacle is the resistance among developers to learn the new programming languages and standards required to develop applications for a host of new technologies, such as client/server computing and electronic data interchange.

According to the report, most systems development groups are entrenched in their use of COBOL, a traditional programming language that is unwieldy and inefficient for developing applications in a business environment increasingly dominated by the personal computer.

“COBOL, together with various [mainframe] operating systems and software (e.g. CICS, IMS), represents a body of knowledge, values, beliefs and ideas about how systems should be de-

(continued on page 20)

How U.S. won net war in the desert

Defense Communications Agency deployed the largest ever tactical net with lightning speed.

By Maureen Molloy
Staff Writer

WASHINGTON, D.C. — Network managers typically have the luxury of time to carefully plan, develop and install a strategic network.

But the rapid mobilization of U.S. armed forces during Operation Desert Shield in the Middle East last summer left network managers at the Defense Communications Agency (DCA) with the daunting task of hastily assembling and deploying the largest tactical network ever constructed.

According to Col. Victor Bowser, commander of the DCA's Network Management Operations Center, the major challenge faced by the agency was quickly assembling a newly designed network that would immediately support reliable communications.

“Communications systems played a big role in the U.S. war efforts during Desert Shield,” Bowser said.

“The critical nature of the network became apparent when key decision makers and their staffs required reliable, secure and instantaneous communications at all times,” he added.

The primary obstacle to rapid deployment of a reliable net was a Saudi Arabian telecommunications infrastructure incapable of handling a giant infusion of voice and data traffic.

When Operation Desert Shield began last August, the U.S. had only the most rudimentary communications infrastructure in the Middle East. But Bowser said that, thanks to good planning, the DCA was able to quickly and smoothly establish a mature tactical network.

Within hours of the first airplane's arrival, the DCA had established connectivity from the National Military Command Center and the executive branch here to the Saudi Arabian Ministry of Defense via the Defense Satellite Communications System.

By the end of Desert Shield's

(continued on page 20)

BOOK REVIEW

BY ERIC SCHMALL

Voice processing guide provides helpful overview

Voice Processing, Walt Tetschner (Norwood, Mass.: Artech House, Inc., 1991), $65.

The first voice processing application was put into practice more than 50 years ago when The Coca-Cola Co. provided a telephone number that people in Atlanta could call to find out the current time and temperature.

It was a classic Rube Goldberg setup. When a call was received, a bell rang into a microphone, which relayed the impulse to a motor that lifted the handset of an old “candlestick” phone. That action triggered two record players, which then played a pair of 78-rpm records in sequence, announcing the time and temperature.

For the next 45 years, voice processing technology moved at a glacial pace. Then in the late 1980s, sophisticated products using voice processing technology began spreading rapidly. Today, voice processing products are making a major impact on the budgets and operations of network departments nationwide.

Voice Processing by Walt Tetschner helps network manag-

(continued on page 49)

Schmall is a network systems manager for an insurance holding company.

How U.S. won net war in the desert

continued from page 19

first week, voice and data communications were established between the U.S. and Al Jubayl, Dhahran and Riyadh in Saudi Arabia, and Thumrait, Oman, via a dozen Ground Mobile Forces satellite terminals linked to the Defense Satellite Communications System.

"The central command decided what communications were needed, when, and in what priority. We were then required to fill those needs as quickly as possible," he said. "The objective was that as soon as the units arrived at their destination, we'd have the backbone in place."

Within 60 days, the DCA had established a network infrastructure rivaling that established for U.S. forces in Europe.

Command stations in the battle theater required flexible communications because of constant moves, adds and changes. The DCA fulfilled that requirement by establishing T-1 speed links over the International Telecommunications Satellite Organization network that supported communications among the command stations in the Middle East and the U.S. Each command station was outfitted with a transportable satellite terminal.

But the DCA feared the satellite system didn't offer redundancy, which meant that communications to a command site could be knocked out during combat. So within weeks, Bowser's team built redundancy into the net by connecting command sites via two separate satellite links. Each command site was then outfitted with multiple tactical automatic switching devices so that terrestrial lines to various field sites could be automatically rerouted.

Since Desert Shield was the most significant military net deployment since divestiture, Bowser's team questioned how easily it could establish a multivendor network environment under combat conditions.

But the multivendor environment turned out to be a boon for his agency. There were virtually no compatibility problems, and multiple vendors even allowed the DCA to obtain faster responses to their urgent requirements.

By January, when Desert Shield had grown into Operation Desert Storm, the network had grown considerably. The DCA was operating more than 100 tactical satellite terminals supported by both the Defense Satellite Communications System and other non-U.S. satellite resources. And by the start of the air campaign, Bowser's team had established almost 300 T-1 circuits supporting voice and data services.

Bowser said the DCA is now planning a permanent network supporting key locations on the Saudi Arabian peninsula that will replace critical portions of the tactical network. By establishing a permanent communications architecture, the DCA will maintain its readiness in the region should there ever be a "next time." ◪

LANDEX
August 8–10, San Francisco

LANDEX OPENS DOORS...

Get the information and insight you need to succeed in the computer networking industry. LANDEX, the only trade show for the LAN reseller, OPENS DOORS TO OPPORTUNITY, GROWTH AND SUCCESS! LANDEX features exhibits and demonstrations of the very latest network solutions, opportunities to meet and learn from industry leaders, and seminars covering everything from technical issues and training to business management, marketing and sales.

LANDEX is sponsored by LANDA
The Trade Association for
the Networking Industry
Call LANDA for complete
details TODAY: (708) 279-2255

LANDEX

LANDEX '91 Northern California
August 8-10, 1991
San Francisco Marriott
San Francisco, California

Users struggle to develop applications

continued from page 19

veloped. In short, COBOL is a major source of problems in systems development," the report said.

Moreover, the survey indicates that systems developers have yet to completely automate various processes in the generation of software code by establishing, among other things, integrated data bases that maintain up-to-date project specifications and track all coding changes.

Without such tools, developers are forced to manually reenter, recommunicate or reinterpret a lot of data collected during the systems development process, said Nicholas Vitalari, vice-president at CSC Index and director of Index Summit, the research program that conducted the survey.

In addition, systems developers have yet to embrace new development methods — such as joint application development and self-directed teams — and have largely spurned the use of newer productivity-enhancing tools such as object-oriented programming and computer-assisted testing and implementation tools.

The report did show that a vast majority of companies — 86% — are experimenting with or using computer-aided software development tools.

"While most other fields continually evolve their tools, for the last three decades, the mainstays of systems development have changed little. The infatuation with tradition in systems development tools and techniques is evident in the survey," the report said.

Systems development departments are also feeling squeezed between a growing demand for new applications and the increasing number of applications they have to maintain. Departments typically support about 100 applications and devote 55% of their staff to maintenance activities.

On the other hand, development staffs initiate an average of 82 new projects a year yet only deliver 45 projects on time and within budget.

According to David Robinson, president of CSC Index, systems departments could significantly increase their productivity if they took the time to prioritize the value of each project — new or old — and allocate only the resources it deserves.

"Right now, maintenance is a resource drain," Robinson said. "Departments could channel more [resources] into new development if they paid more attention to separating the wheat from the chaff in their large systems backlogs." ◪

Worth Noting

MCI Communications Corp. is the leading U.S. supplier of international analog private lines with 38% of the market, followed by World Communications, Inc. with 30%, AT&T with 20% and TRT/FTC Communications, Inc. with 10%, according to MarTech Strategies, Inc., a market research firm in Indialantic, Fla.

World News

AT&T last week announced it is giving its vice-chairman, Randall Tobias, responsibility for managing all of the international activities for the carrier's 21 business units.

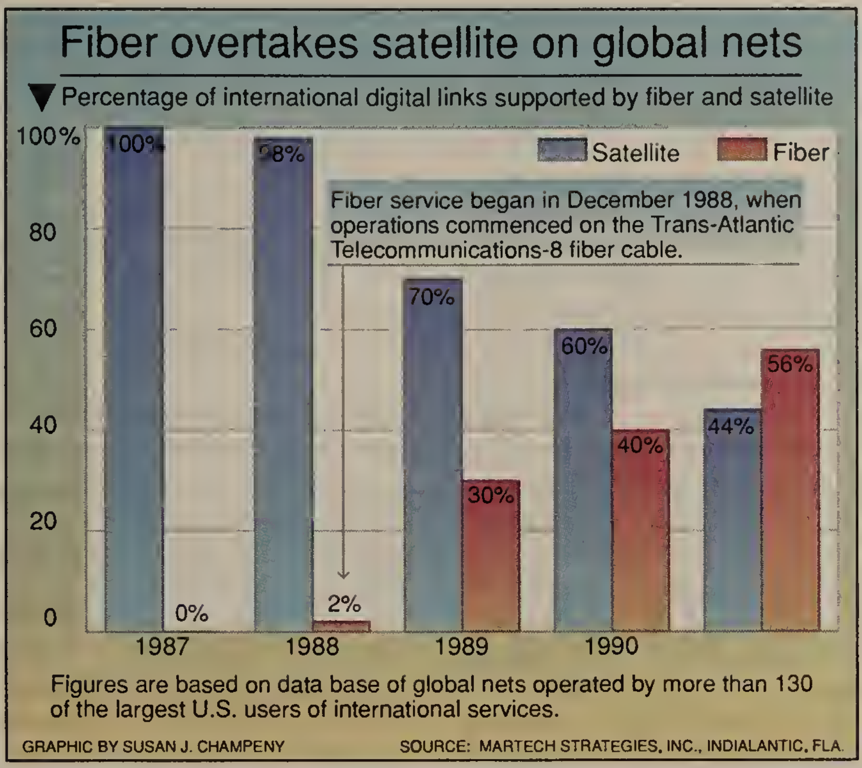
In his new role, Tobias will oversee AT&T's International Communications Services division, which handles international services as well as the AT&T business units responsible for international network equipment and computer sales.

Currently, AT&T's business units chart their own international strategy, with minimal coordination by Sam Willcoxon, AT&T's group executive-international. Willcoxon will report to Tobias.

Tobias will have more direct control over international activities than Willcoxon had. This means international business will gain more attention from top management, according to an AT&T spokesman.

AT&T now receives 15% of its revenue from international services and product sales but wants to increase that figure to between 20% and 25% by the mid-1990s.

Currently, Tobias oversees AT&T business units that provide both domestic and international services and equipment sales as well as the AT&T Universal Card.


Fiber overtakes satellite on global nets

▼ Percentage of international digital links supported by fiber and satellite

Fiber service began in December 1988, when operations commenced on the Trans-Atlantic Telecommunications-8 fiber cable.

Figures are based on data base of global nets operated by more than 130 of the largest U.S. users of international services.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: MARTECH STRATEGIES, INC., INDIALANTIC, FLA.

Fiber takes the lead over satellite in int'l digital nets

Fiber perceived as better transmission medium.

By Barton Crockett
Senior Editor

INDIALANTIC, Fla. — For the first time ever, fiber-optic cables have surpassed satellites as the dominant media supporting global digital networks, according to a research firm based here.

As of midyear, 56% of all digital bandwidth installed by the largest U.S. users of international services was based on fiber-optic cables, while the remaining bandwidth was supported by satellite facilities, according to Ronald Eward, president of MarTech Strategies, Inc.

> The number of international fiber cables landing on the U.S. mainland is expected to at least double by 1996.
>
> ▲▲▲

This shift represents a milestone because, until this year, satellites had been the dominant medium for international digital private lines (see graphic, this page). It also reinforces arguments by some observers that the proliferation of international fiber capacity will greatly curtail demand for satellite services.

"Fiber cable is displacing satellite mainly because it's perceived as a better transmission medium," Eward said.

The data was culled from a MarTech data base of international private networks installed by more than 130 of the largest U.S. users of international services. Eward defines these users as companies that spend more than $500,000 per year on international services. He said about 200 U.S. companies fit into this category. Eward said these users purchase the majority of international services sold to Americans.

The preponderance of fiber-optic facilities in global nets is particularly striking because international fiber only became available in December 1988, when the Trans-Atlantic Telecommunications-8 fiber cable went into service.

Since that time, five international fiber cables have commenced service between the U.S. and the continents of Asia, Europe and South America, and users have rushed to lease circuits on the new facilities.

Carrier deployment plans suggest that the number of international fiber cables landing on the U.S. mainland is expected to at least double by 1996. These new cables will support vastly higher capacities than their predecessors.

Eward said the relative preponderance of fiber in global private networks will increase as more fiber facilities become available. In routes where fiber is readily available, such as between Europe and the U.S., it is used to support about 70% of the international bandwidth leased by U.S. users, he said.

But Eward said he believes satellite usage will never drop below 25% of users' international digi-

(continued on page 22)

Swedish firm plans packet net launch

Tele2 AB will offer packet services to eight cities in Scandinavia; net launch slated for December.

By Ellen Messmer
Washington Correspondent

KISA, Sweden — Officials at Tele2 AB, Sweden's first alternative carrier to Televerket, the government-owned telephone company, said the start-up plans to roll out packet-switching services in December.

Tele2 has also inked a resale agreement with Sprint International, which will enable business customers in the U.S. to purchase Tele2's data services directly through US Sprint Communications Co.

Tele2's new X.25 public network will provide service in Sweden, as well as to nodes in Norway and Denmark. Sprint International built the eight-node network under contract to Tele2.

Tele2, which was initially established by Swedish conglomerate Industriforvaltnings AB Kinnevik and British carrier Cable & Wireless PLC to serve business customers, began offering services earlier this year on its Switched Internet Protocol Network (SwipNet).

SwipNet operates at up to the European T-1 speed, the 2.048M bit/sec E-1 standard. The net consists of about a dozen nodes in Sweden and is still growing, according to Per Troborg, Tele2's managing director.

The carrier's first major push to win business customers will come in December, when the X.25 network is completed and Tele2 can begin providing a new line of packet-switching services as well as support for IBM's Synchronous Data Link Connection protocol.

Packet-switching nodes for Tele2 have been deployed in the Swedish cities of Goteburg, Malmo, Norrkoping, Stockholm,

(continued on page 22)

NPC fiber cable in Pacific suffers three-week outage

By Barton Crockett
Senior Editor

VANCOUVER, Wash. — A new fiber-optic cable in the Pacific Ocean has been hampered by technical difficulties that have kept it out of service for more than three weeks.

As of press time, service had still not been restored on the North Pacific Cable (NPC), which suffered an outage on June 3. But officials with Pacific Telecom Cable, Inc., based here, which manages the U.S. half of NPC, said typical NPC operations could be restored by July 1.

Pacific Telecom officials said the impact on users was minimal because all traffic running over NPC was rerouted over satellite facilities within 75 minutes of the outage.

Although many users say satellite restoration of fiber facilities can have a negative impact on applications sensitive to propagation delay, no reports of user problems from the outage could be found as of press time.

Many users, including Bank of America National Trust & Savings Association, plan to run private lines over NPC but have not yet brought their circuits on-line.

NPC, which went into service on May 15, is the second fiber cable linking the U.S. to Asia. Nearly all U.S. carriers that provide international services plan to use the cable to carry both switched and dedicated traffic.

Stephen Lovas, Pacific Telecom's president, said many carriers are already providing service over NPC, although he declined to name them.

The cause of the outage, which occurred on a portion of the cable about 700 km east of Japan, has not yet been determined, Lovas added.

History of problems

The NPC outage represents the latest example of major international fiber cables experiencing service difficulties in the initial months of operation. Other submarine fiber cables that have suffered similar outages include Trans-Atlantic Telecommunications-8 and the Hawaii-4/Trans-Pacific Cable-3 fiber system.

Carrier officials say submarine fiber cables are most vulnerable to outages in the first months of operation because design and equipment flaws are most likely to surface during this period.

Fiber takes the lead in int'l digital nets

continued from page 21

tal private-line bandwidth, because satellite circuits can serve areas where no fiber is available. Satellite will also continue to be attractive to users that can install earth stations on or near their premises.

One problem, though, is that many countries restrict private satellite nets and force users to access satellite links through less convenient, shared hub earth stations operated by local monopoly carriers.

Eward estimated that U.S. users now operate about 4,000 to 5,000 64K bit/sec international digital circuits or 64K bit/sec equivalents on a larger circuit. He said this probably represents about half of all international digital private-line capacity installed by users worldwide.

According to Eward, international digital private-line service first became operational in the U.S. in 1985, when the International Telecommunications Satellite Organization rolled out its International Business Service (IBS) satellite-based digital private-line service. Merrill Lynch & Company, Inc. became INTELSAT's first U.S. IBS customer when it cut over an IBS circuit late that year.

He said another big trend documented in MarTech's global private network data base is the rise of AT&T as a leading international digital private-line carrier.

AT&T's share of the international private-line market is much smaller than its portion of the international public switched telephone market because of regulatory restrictions that banned the carrier from marketing international private-line services until 1979.

In 1986, when the international digital private-line market was still young, only 11% of the international digital private lines installed by users and tracked by MarTech were leased from AT&T. The market leader was Communications Satellite Corp., which at that time held 17% of the market.

Now 44% of the international private lines installed by users on MarTech's data base are leased from AT&T, followed by MCI Communications Corp. with 24%, World Communications, Inc. with 9%, TRT/FTC Communications, Inc. with 7% and IDB Communications Group, Inc. with 4%. IDB purchased COMSAT's retail international private-line business from Contel ASC in 1989. MarTech's figures indicate that US Sprint Communications Co. has only 2% of the international private-line market.

"AT&T has really come on strong," Eward said. He explained that many large corporations prefer to use the same carrier internationally that they use domestically, instead of taking the risk of going with smaller carriers that do not handle much domestic traffic. ◘

Swedish firm plans packet net launch

continued from page 21

Sundsvall and Vasteras, according to Gerald Smart, manager of sales support for Sprint International in Sweden. Tele2 switches have also been installed in Oslo, Norway, and Copenhagen, Denmark.

Last January, Tele2 and Sprint International also signed interoperability agreements to link the Tele2 Scandinavian network into Sprint International's worldwide packet-switching network, which provides access to 75 countries.

Prices for Tele2 services have not yet been announced, Troborg said.

Last January, Tele2 commissioned Sprint International to build the Scandinavian X.25 network using the Sprint Telenet line of packet switches. The network is now entering a test phase, Smart said.

Broader goals

Tele2 also expects to provide digital leased-line services and international switched voice service in 1992, once the company completes its work on a fiber-optic network now under construction, Troborg said.

> "Under today's tariff, local or long distance counts the same," Troborg said. "It's not distance-dependent."
>
> ▲▲▲

"We are building a fiber-optic network in cooperation with the Swedish railroads," he said, adding that the fiber laid alongside the nation's rail tracks will form the backbone of Tele2's network.

Tele2 is now evaluating voice switch suppliers, and the firm is planning to establish international operating agreements with several international carriers.

Troborg said Swedish regulators are now considering changing the country's local-access interconnection tariff policy, which currently makes it too expensive for an alternative carrier to offer domestic switched voice service.

"Under today's tariff, local or long distance counts the same," Troborg said. "It's not distance-dependent."

He added that a favorable regulatory outcome would allow Tele2 to provide domestic switched voice service as well. ◘

The First 150 Fax Get The Facts on Global Type Approval

All countries have rules and procedures associated with attaching telecommunications equipment to networks. However, countries differ on which of a variety of technical standards should apply to those devices that will be integrated into a network.

Gaining telecommunications equipment approval to market your products globally is a new area but one manufacturers and marketers must contend with. To sell your telecommunications equipment effectively in all foreign markets, you must comply with regional, national and international standards — in 30 countries spanning four continents.

BT Teleprove, Network World and **Squire, Sanders & Dempsey** are pleased to present the Global Telecommunications Equipment Approval seminar.

- Get the answers you need on global standards.
- Find out how most country's approval processes differ.
- Discover how to obtain certificates of approval, quickly — anywhere in the world.

The Global Telecommunications Equipment Approval seminar will educate manufacturers of telecommunications equipment on how best to approach their global type approval requirements. Topics covered will include:

- The type approval process as part of marketing strategy.
- The role of international standards.
- How countries approach equipment certification.
- Overview of testing options.
- Country approaches.
- Regional approaches.
- Do's and don'ts of global certification projects.

Network World • BT Teleprove • Squire, Sanders & Dempsey

The seminar will be held on Monday July 15 and half a day on Tuesday, July 16 during ComNet West. The cost will be $695.

To tentatively confirm one of the 150 course openings please fill out the form below and fax to Nanci Farquharson at 508-879-3167 or call 508-820-7402 or mail to:

Network World Inc.
161 Worcester Road
Framingham, MA 01701

Name ______________________
Title ______________________
Company ______________________
Address ______________________
City __________ State __________ Zip __________
Tel. __________ Fax __________

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

NSA offers 3270 emulator with low memory usage

Network Software Associates, Inc. (NSA) recently announced an IBM 3270 emulation package for DOS-based personal computers that supports five host sessions, while only using 77K bytes of memory.

NSA's **3270/ElitePlus** emulates an IBM 3278 (Model 2, 3, 4 and 5) or 3279 (Model 2a or 2b) display station, and as many as two IBM 3287 printers. The software, which runs on the IBM Personal Computer XT, AT and Personal System/2, supports as many as five concurrent logical unit sessions, which can be any mix of printer or terminal sessions. It supports IND$FILE file transfers in any TSO, CICS and CMS host environments.

3270/ElitePlus is priced at $395 or $1,295 for a network license that operates with NSA's AdaptSNA LAN Gateway. The product is available now.

Network Software Associates, Inc., 39 Argonaut, Laguna Hills, Calif. 92656; (714) 768-4013.

Sharp rolls out new full-color fax machine

Sharp Electronics Corp. has announced a color facsimile machine capable of transmitting picture-quality color documents. The **FO-9000** uses Sharp's existing digital image processing technology, as well as newly developed printer, compression/expansion and high-speed modem technology.

The device can transmit an accurate reproduction of any original as large as 8½ by 11 inches and is optionally compatible with Group III fax machines.

The printer in the fax reproduces images by sublimating dye in an ink layer on a thermal-sensitive ribbon with the heat of a thermal printing head. A full-color original can be transmitted in approximately three minutes.

The FO-9000 is priced at $31,999 and will be available July 1.

Sharp Electronics Corp., 10 Sharp Plaza, Mahwah, N.J., 07430; (800) 237-4277.

PBX gets link to switched data services

By Bob Wallace
Senior Editor

MIAMI — Northern Telecom, Inc. announced at the recent International SL-1 Users Association meeting here a package that enables its Meridian 1 PBXs to directly access local and long-haul switched data services.

The package includes a high-speed data module and a four-port data line card for the Meridian 1 private branch exchanges. The data module enables user devices to establish a 56K or 64K bit/sec channel on an Integrated Services Digital Network Primary Rate Interface link to access switched services.

The public switched data services package bolsters the Meridian 1's support for data applications including videoconferencing, bulk data transfer, Group IV facsimile transmission and local-area network bridging.

Meridian 1 PBXs must have X11 Release 16 operating system software to use the new products.

A workstation or videoconferencing equipment is linked via a V.35 interface to the High-Speed Data Module, a stand-alone device with its own keypad.

The module is then linked via a four-wire connection to the QPC 432 line card in a Meridian 1 peripheral equipment shelf. The QPC 432 card supports four High-Speed Data Modules, with each module supporting one user device.

To establish a switched circuit, a user dials the intended destination on the module's keypad. The module then chooses a port on the line card, which is used to establish the link.

Greater access

The package, previously available with the high-end Meridian 1 models — the Option 111 and 211 — is now available for all models.

"This gives users greater flexibility in accessing high-speed circuits," said Vince Rafferty, a principal with The Aries Group/MPSG, a Rockville, Md., consultancy. "Before, users could only access dedicated lines through the Meridian. Now they can access switched links as well."

The High-Speed Data Module costs $780, while the QPC 432line card costs $990. Both items are available now.

Firm unveils mass storage server for RS/6000 cluster

SAN JOSE, Calif. — Maximum Strategy, Inc. recently announced a storage server for the IBM RISC System/6000 that can be configured with up to 43G bytes of disk storage and support a cluster of RS/6000s or other workstations using the Network File System over TCP/IP.

The Strategy RS/6000 Redundant Array of Inexpensive Disks (RAID) Storage Server houses as many as 40 5¼-in. Enhanced Small Device Interface hard disk drives, which together provide a sustained data transfer rate of 18M byte/sec.

The server can be used as a stand-alone for a single RS/6000. It can also be linked to an RS/6000 configured as a file or computer server in an RS/6000 cluster or a Transmission Control Protocol/Internet Protocol environment.

It is designed to support storage-intensive applications, such as RS/6000 network file services, computer-aided design and manufacturing, and simulation of computational fluid dynamics.

The server is available in two configurations.

The first, offering up to 10.8G bytes of storage, is based on a rack enclosure containing eight data drives, one parity drive and one hot standby drive. In case of a drive failure, the hot standby kicks in and data can be reconstructed from the parity drive on the fly.

The second configuration, which offers from 10.8G to 43.2G bytes of storage in increments of 10.8G bytes, is based on an expandable rack enclosure that can accommodate as many as 40 disk drives for a system total of 32 data drives, four parity drives and four hot standby drives.

The server includes a proprietary intelligent controller, a Micro Channel interface, a maximum of 40 hard disk drives, an RS/6000 software driver and one rack enclosure.

Costs for the minimum configuration start at $112,750. The product is expected to be available July 15.

For more information, contact Maximum Strategy at 2185 Old Oakland Road, San Jose, Calif. 95131, or call (408) 456-8887.

Clearpoint multiport bridge card debuts

RISC chip allows as many as four Ethernet LAN connections, improved packet forwarding rates.

HOPKINTON, Mass. — Clearpoint Research Corp. last week unveiled a multiport bridge that fits into a personal computer, enabling users to connect as many as four local Ethernet segments.

The company's Auriga add-on card for Industry Standard Architecture- and Extended Industry Standard Architecture-based personal computers uses Reduced Instruction Set Computer (RISC) technology that enables it to support greater packet forwarding rates than Intel Corp. 80386-based local bridges, the firm said.

Users can also buy a separate wide-area network card that attaches to Auriga, providing local devices with a single WAN link.

Auriga is a board-level implementation of Clearpoint's Little Dipper, a stand-alone bridge that supports a maximum of eight local Ethernet connections and two WAN connections. However, Auriga costs only about half of Little Dipper's base price of $7,495.

The vendor is positioning Auriga as a feeder bridge capable of linking local-area networks at remote sites, as well as providing a wide-area connection to a Little Dipper or another Auriga at a data center.

The bridge uses an Advanced Micro Devices, Inc. AMD 29005 RISC microprocessor, which enables it to offer a packet forwarding rate of 14,880 packet/sec for 64-byte packets per LAN, compared to 5,000 to 10,000 packet/sec for non-RISC-based bridges, according to Douglas Antaya, director of product marketing for Clearpoint's network products division.

"This is the type of performance that will make users oblivious to whether a server is on a local Ethernet segment or on a bridged connection," Antaya said.

Auriga is a media access control-layer bridge that is transparent to network transport protocols such as Novell, Inc.'s Internetwork Packet Exchange (IPX), Open Systems Interconnection, Transmission Control Protocol/Internet Protocol and Xerox Corp.'s Xerox Network Systems.

It supports the Spanning Tree Algorithm, which assures users that any LAN linked to the bridge will have an alternate backup path in the event of a network fault. Automatic reconfiguration occurs when a fault is detected.

Like Little Dipper, Auriga provides as many as 32 custom filters that enable network administrators to create "fire walls" to restrict and direct the flow of LAN traffic between hosts, ports or bridges.

Clearpoint offers an optional WAN daughtercard that attaches to the Auriga and uses a separate slot in the host personal computer. The WAN card provides a single DB25 connector and supports data transmission rates up to 384K bit/sec.

The wide-area daughtercard will initially support frame relay technology, but Antaya said Clearpoint plans to add X.25 support by the end of the summer.

> This is the type of performance that will make users oblivious to whether a server is on a local Ethernet segment or a bridged connection.

▲▲▲

Auriga can be monitored and controlled by Clearpoint's StarWatch network management software. The bridge also supports a Simple Network Management Protocol (SNMP) II agent, enabling SNMP-based network management packages to control Auriga devices.

Auriga costs $3,995 for a single card with four LAN ports. Users can purchase the optional WAN card for $995. Auriga is slated to ship on July 15.

Clearpoint also said it has added support for two wide-area connections to the Little Dipper, enabling it to support as many as eight LANs and two WAN links.

Antaya said the vendor plans to add routing capabilities to the Little Dipper within six to nine months. Initially, the company will support Apple Computer, Inc.'s AppleTalk, Digital Equipment Corp.'s DECnet and IPX routing protocols.

For further information, contact Clearpoint at 35 Parkwood Drive, Hopkinton, Mass. 01748, or call (508) 435-2000.

OPINIONS

ELECTRONIC DATA INTERCHANGE

BY VICTOR WHEATMAN

Is X.435 the EDI interconnection solution?

In the electronic messaging world, implementing X.400 has become, like the Holy Grail, the objective of a prolonged endeavor. X.400 connections between all major electronic mail value-added network (VAN) services are in place. However, in practice, these E-mail links are a problem because networks have not implemented X.400 consistently.

For example, the X.400 specification has not yet been implemented on a broad basis for electronic data interchange networking. This year, some VANs will reveal plans to support the recently approved CCITT X.435 recommendation specifically designed for application-to-application EDI messaging.

For the most part, today's EDI connections are "dial and dump" arrangements. With this plan, the receiving network accumulates transactions for trading partners on a second network. Then at a scheduled time, the network dials out to a mailbox on the other network and dumps messages, which are then distributed. Sometimes, acknowledgments are retrieved the next time the networks link.

> The mailbag will allow X.435 implementations when they are ready and users want them.
>
> ▲▲▲

Such VAN interconnections are deficient regarding audit trails, particularly when sending large amounts of data. As a result, VAN support staff often succumb to finger-pointing exercises when a problem with interconnected data links occurs. Because of these problems, some companies are whittling down the list of VANs they use to one or two.

There is a near-term solution to these network interconnection problems — the Interconnect Mailbag Structure (X12.56), a standard designed for network interconnection that the ANSI X12 committee is expected to approve soon.

According to the X12.56 committee's proposal, X12.56 will provide a structure around a "mailbag," which contains "EDI data to be exchanged between two interconnecting entities . . . consisting of a header and trailer to envelop the interconnect data and a structure to acknowledge the receipt and safe storage of the envelope and its contents." It will support multiple interconnects and allow X.400 implementations on one or more segments by maintaining the necessary identifications, X.400 tracking mechanisms and similar services. However, X12.56 has been criticized as only an interim solution because X.400, in conjunction with X.435, is intended to solve internetworking problems.

But X.435 has its own set of problems, such as overhead requirements that result from features verifying receipt of a message. Granted, users can turn off such features, but then they risk running inconsistent implementations. Based on the development history of X.400, it's likely that X.435 products and services won't be widely available before 1992.

After weighing the factors, it appears that the X12.56 mailbag for VAN interconnections will place the fewest near-term demands on companies relying on EDI while solving some of the interconnection problems now vexing both users and carriers. The mailbag will allow the introduction of X.435 implementations when they are ready and users want them.

The cost to VANs of developing X12.56 mailbag capabilities will not be onerous; VAN interconnection fees will probably be increased to cover development costs. In return, users should get improved interconnect service supported by X12.56. ☑

Wheatman is program director of interenterprise systems at Gartner Group, Inc. in Santa Clara, Calif.

NETWORK WORLD

Editor
John Gallant

Executive Editor
John Dix

Assistant Managing Editor — News
Charles Bruno

Senior Editors
Bob Brown — Industry Update
Barton Crockett — International Networking
Paul Desmond — Data Communications
Wayne Eckerson — Management Strategies
Eric Smalley — Local Networking
Bob Wallace — Telecommunications

Caryn Gillooly — Local Networking
5423 Gladewright Drive
Centreville, Va. 22020
(703) 266-1537
Fax: (703) 266-1543

Staff Writer
Maureen Molloy

West Coast Bureau
Timothy O'Brien — Bureau Chief
2088 Union Street, Suite 2
San Francisco, Calif. 94123
(415) 771-3530
Fax: (415) 771-2817

Washington D.C. Bureau
Anita Taff — Bureau Chief
(202) 879-6744
Ellen Messmer — Correspondent
National Place
1331 Pennsylvania Ave. NW, Suite 505
Washington, D.C. 20004
(202) 879-6752

Features Editor
Paul Strauss

Managing Editor — Features
Jim Brown

Associate Features Editors
Alison Conliffe
Susan Collins

Features Writer
Salvatore Salamone

Design Editors
Susan Champeny
Susan Slater

Assistant Managing Editor — Production
Beth Khoury

Copy Editors
Michelle Beaulieu
Skip MacAskill
Elizabeth Marshall
Karen Moltenbrey

Assistant to the Editor
Cheryl Tynan

Editorial Assistant
Glenna Fasold

Contributing Editors
Daniel Briere
James Kobielus
Edwin Mier
Alan Pearce

Teletoons
Phil Frank
Joe Troise

President/Publisher
Gary J. Beach

Director of Financial Operations
Mary Fanning

Network World
161 Worcester Road
Framingham, Mass. 01701
(508) 875-6400
MCI Mail — 390-4868
Fax: (508) 820-3467

An IDG Communications Publication

USER ADVISORY PANEL

Laurie Bride
Manager, Network Architecture
Boeing Computer Services

Roy Bruce
Senior Adviser
International Communications Association

Phillip Evans
Director, Telecommunications
FMC Corp.
President
International Communications Association

Len Evenchik
Director of Communications
The Commonwealth of Massachusetts

Thomas Festa
President
Wall Street Telecommunications Association

Lionel Gillerman
Telecommunications Services
McDonnell Douglas Aerospace
Information Services Co.
Vice-President for Regulatory Affairs
Tele-Communications Association, Inc.

E.W. Bud Huber
Senior Consultant
Hughes Aircraft Co.
Chairman, User Alliance for Open Systems

Michael Kaminski
Manager, CIM/Networking Technologies
General Motors Corp.

Ron Kopitowsky
Telecommunications Director
Metropolitan Transportation Authority, New York State
President, Communications Managers Association

Donna Kwak
Senior Vice-President
Chase Bank of Arizona
President, Tele-Communications Association, Inc.

Chuck Papageorgiou
Network Administrator
United Parcel Service, Inc.

Henry Pfendt
Director, Information Technology Services
Eastman Kodak Co.

Kenneth Phillips
Vice-President, Office of Telecommunications Policy
Citicorp
Chairman, Committee of Corporate
Telecommunications Users

William Pomeroy
Director of Telecommunications Public Policy
International Communications Association

Michael Toto
President
Association of Data Communications Users

Stanley Welland
Manager,,Corporate Telecommunications
General Electric Co.

EDITORIAL

Tighten FTS 2000 controls, and give users a choice

Congressional investigators are already at work to determine whether there have been any mistakes made in assigning government departments to AT&T or US Sprint Communications Co. under the Federal Telecommunications System (FTS) 2000 contract.

Now they should broaden their investigation and look into the efficiency of FTS 2000's administrator, the General Services Administration.

There's good reason: Numerous user complaints about lost order forms, inadequate digital local access, inaccurate billing and many other problems were voiced at an FTS 2000 user forum held in Denver late last month.

Also, the Bush administration should look into ways to allow FTS 2000 users, under certain limited conditions, to choose their own carrier, thus encouraging competition between AT&T and US Sprint, the two FTS 2000 vendors.

Currently, the agencies that use FTS 2000 — and all must eventually — are assigned to either AT&T or US Sprint by the GSA in order to achieve a 60/40 AT&T/US Sprint revenue split. The government agencies have no say in the decision. No matter whose service they prefer, they are assigned to one or the other and apparently must stick with that vendor for the life of the contract.

This lack of choice may well promote savings on the FTS 2000 bill, but it doesn't give users much power. The government departments and agencies that use FTS 2000 have been saying they don't get the same careful customer service from AT&T and US Sprint that those vendors give to users of considerably smaller nongovernmental networks.

At this juncture, it may seem virtually impossible to revise FTS 2000 to let users choose between AT&T and US Sprint.

But perhaps all is not lost. The Office of Management and Budget (part of the Executive Office of the President) is reportedly considering proposing new legislation to allow FTS 2000 users in limited cases to choose a vendor outside the FTS 2000 contract.

The choices would be allowed in cases where adequate service is unavailable under the contract. For example, fractional T-1 is not yet available under FTS 2000, nor is T-3.

If this could be worked out within the framework of the FTS 2000 contract, it certainly seems worth looking into. The FTS 2000 user agencies would welcome even a limited chance to have a choice. And competition might even save the government money while promoting efficiency. ☑

OPINIONS

MACROSCOPE

BY JAMES KOBIELUS

On the net manager's role as guardian of privacy

Privacy — the right to ward off intrusions into our personal lives — is a luxury few of us can afford these days. Telecommunications and information systems (IS), which make our lives accessible to countless others, often without our knowledge, are partly to blame.

Networks are predicated upon sharing, but there are many things about ourselves that we would rather not share with the whole world. That's the price we pay for living in modern times. Every time we use a credit card to make a purchase or book an airplane flight, we provide somebody somewhere with the means to track our activities.

Every time we use a wireless telecommunications technology, we sacrifice confidentiality for the sake of untethered calling convenience. And microcellular personal communication services will make it possible to track our every movement with uncanny precision.

Such technological advances have caused privacy to become a hot issue in public policy and regulatory circles worldwide. In addition, stringent privacy protection measures introduced recently by the European Community have caused countries there and elsewhere to rethink their regulatory approaches.

Governments around the world are establishing regulations for the collection, processing, management, transmission and use of personal data. Many industrialized countries have established data protection agencies to monitor public and private sector management of personal data. The U.S. has no such centralized privacy board — despite past and pending legislation to accomplish that. But it does have a diverse set of industry-specific privacy-related statutes and regulations at the federal and state levels.

As keepers of personal data, network and IS managers will increasingly be caught in the crossfire of public concern over privacy. Information technology professionals are being asked to pay greater attention to privacy issues in systems planning, design and operations.

How should systems professionals manage their growing responsibilities as privacy guardians? First, they should encourage their companies to establish internal privacy protection codes in keeping with appropriate laws as well as widely accepted principles, such as those promulgated by the Organization for Economic Cooperation and Development. Many multinational firms, such as American Express Co., have long had effective privacy protection codes.

> Nets are predicated upon sharing, but there are things we would rather not share.
>
> ▲▲▲

Net managers should then translate corporate privacy protection rules into specific operational policies and procedures. A comprehensive network privacy protection program would touch on the following key concerns:

■ **Data inventory.** Network and IS managers should conduct a detailed inventory of all data held by the company that might be subject to privacy protection. The most likely candidates for privacy protection include personal profiles (employment records, customer preferences, medical records) and transaction records (sales receipts, itemized bills, telephone call-detail reports), as well as messages and correspondence (electronic mail).

■ **Network security.** Network security practices should be reexamined to determine whether they are providing the appropriate access control, encryption techniques and physical safeguards for sensitive data files and for the networks on which they are carried.

Special attention should be paid to wireless communications systems, such as cellular telephony and point-to-point microwave, which are vulnerable to eavesdropping by unauthorized parties. Any broadcast or multipoint technology — including local-area networks, packet switching and conference calling — also presents means for unauthorized access.

■ **Remote monitoring and tracking.** Telecommunications managers should establish policies regarding remote monitoring and tracking of network users, clearly indicating when such practices serve legitimate business purposes. Companies may want to provide callers with the option of striking out automatic number identification information from corporate call-detail records, or at least blocking the four-digit subscriber code.

In addition, companies should consider the privacy implications of up-and-coming mobile communications technologies — such as radio-determination satellite service and microcellular in-building voice networks — which enable pinpoint, real-time tracking of people's locations.

At stake in the privacy debate is the ability of people to take control of their lives by monitoring and verifying information kept on them by public and private sector organizations. Systems professionals should perceive themselves not as owners of personal data, but as guardians and custodians.

Kobielus, a contributing editor to Network World, *is a telecommunications analyst with Fairfax, Va.-based Network Management, Inc., one of the largest local- and wide-area network systems integrators in the U.S.*

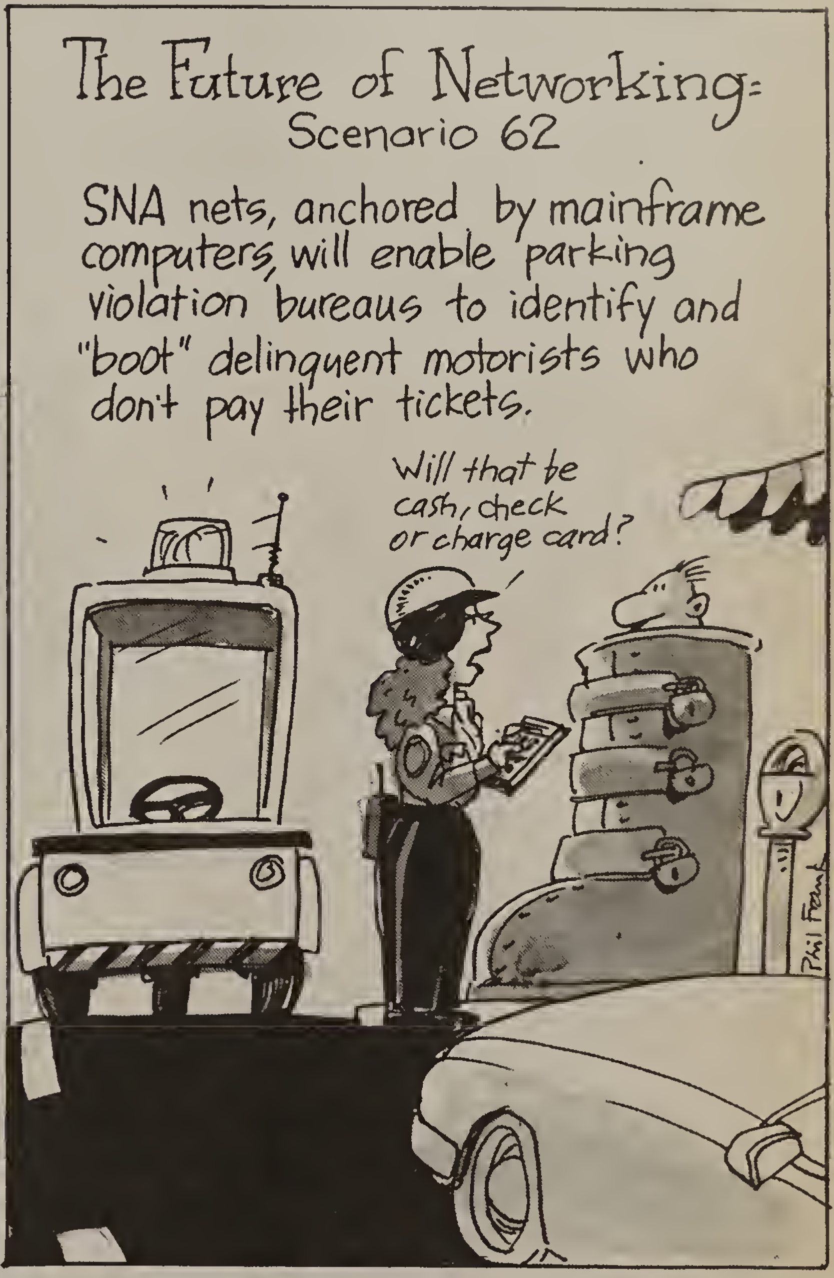
"HOPE DEFERRED MAKETH THE HEART SICK," the Bible says. How true! We're heartsick from hoping for a column from you. Write one today!

Columns should be 600 words in length and submitted on disk, via modem or through MCI Mail at 390-4868.

If you'd like to write a column, call Alison Conliffe, associate features editor, at (508) 820-7416 or fax your idea to us at (508) 820-3467.

TELETOONS

BY FRANK AND TROISE


The Future of Networking:
Scenario 62
SNA nets, anchored by mainframe computers, will enable parking violation bureaus to identify and "boot" delinquent motorists who don't pay their tickets.
Will that be cash, check or charge card?
Phil Frank

LETTERS

Channel extension choices

Your recent article "Channel extenders let firm optimize net" (*NW,* May 20) detailed the benefits of a channel extension vendor whose support included running channel-attached devices at their full rated speed.

Your readers should know that Computerm Corp. has been providing support for the IBM 3800 line of high-speed printers, IBM 3890 document processors, microfiche units, front-end processors operating in Emulation Program and Network Control Program modes, and cluster controllers providing subsecond response time.

Computerm can also support other IBM or IBM plug-compatible devices at baud rates up to full T-1. The company will support rates up to two full T-1 lines byplexed by year end.

The Computerm system, which is completely transparent to all operating systems and application software, can support multiple host channel connections. Additionally, there are no distance restrictions and all devices are run at their full rated speed.

Richard Madden
Executive vice-president
Computerm Corp.
Pittsburgh

Realistic voice recognition

As someone who has followed voice recognition technology for 20 years, I hope the efforts at EJV Brokerage, Inc. ("Brokerage firm counts on voice recognition for edge," *NW,* June 3) bear fruit.

Many of the original pioneers in this field are gone, destroyed by overly enthusiastic market projections that failed to materialize. Minor successes were achieved, but consumer and office applica-

(continued on page 38)

Network World *welcomes letters from its readers.*

Letters should be typed and double-spaced. Mail them to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

© 1991 AT&T

Nothing supports your busines

We're bigger on customer service than ever before starting with our Account Teams. They are committed to understanding your specific needs. And have the resources to address them.

Resources like our Customer Service Centers that are manned by handpicked service experts and equipped with state-of-the-art, fingertip technology. From there, we can actually monitor your network end-to-end, isolate faults, and initiate immediate repair.

When it comes to answering and anticipating customer requests for new product features and enhanced functionality, AT&T can respond like no one else. Because unlike any other T-1 provider, we can call on AT&T Bell Laboratories, world-renowned for their innovations.

We also have state-of-the-art capabilities that allow us to design the most efficient and cost-effective network solutions, based on your particular needs.

like AT&T ACCUNET® T1.5 Service.

So if you want customer service that will support your business in a big way, call us. By comparison, everything else is just lip service.

Digital solutions that match your needs.
Another AT&T advantage.

For more information about ACCUNET Digital Transport Services, call your AT&T Account Executive or 1 800 247-1212, Ext. 439.

AT&T
The right choice.

THE

MANUFACTURING NETWORKS

CONFERENCE

CHICAGO, AUGUST 12–13, 1991

Playing the Trump Card of Technology

Playing the trump card of network technology today will determine your competitiveness in the global marketplace tomorrow.

Advanced manufacturing networks can level the playing field for U.S. companies competing against aggressive foreign rivals that often enjoy lower labor costs and protectionist trade policies. Networking technology streamlines design, development and production and enables you to bring products to market more quickly. It allows you to build stronger ties to customers and suppliers and operate more efficiently and productively.

At this conference you'll see how leading companies are building the enterprise manufacturing network—an information superhighway that extends from the factory floor to the executive suite and out to customers and suppliers.

Learn about the hottest networking topics from speakers of the leading manufacturing companies ...Alcoa, Corning-Asahi, Digital Equipment, General Motors, Hughes Aircraft, IBM, John Deere, Monsanto, Northrop, SteelCase, Texas Instruments, Warner-Lambert, and The Corporation for Open Systems International. Plus...hear a special keynote presentation from a top network official at Saturn Corp.

- Making CIM and concurrent engineering a reality
- Handling network cutovers and upgrades without headaches
- Designing and building an open, standards-based manufacturing network
- Applying LANs effectively
- Using MAP-based networks
- Breaking down the organizational barriers that stand in the way of manufacturing network excellence
- Building a paperless manufacturing environment
- Extending your networks to customers and suppliers
- Making JIT manufacturing work

The Product Showcase at The Manufacturing Networks Conference gives you the opportunity to interact with top networking vendors and gain the product education you need to make key product purchasing decisions.

3Com Corporation
Atlanta Technologies, Inc.
The Brown Computer Company
Cable-Comm Technologies
Cabletron Systems Inc.
ChipCom Corporation
Cisco Systems
Digital Equipment Corporation
Lannet Data Communications
Mohawk Wire & Cable
Novell, Inc.
Optical Data Systems
RAD Network Devices
Teleport Communications Group
Wellfleet Communications
Zenith Electronics Corporation

Interested in exhibiting? Call Tom Reilling at (508) 470-3870.

Remember: The technology decisions you make today will shape your future. Call **(508) 470-3880** today to get more information on this one-of-a-kind event.

Sponsored By:

NETWORK WORLD
The Newsweekly of User Networking Strategies

dci Digital Consulting, Inc.

DA71WN

Fine-tuning the videoconference

Being there is half the fun, but it's much more expensive.

New Yorkers probably know more about compression than anyone else in the country. If you don't believe it, try riding their subway system during rush hour.

But putting two humans in the space meant for one is nothing compared with the signal compression achieved by today's videoconferencing coder/decoders (codec).

Over the past two years, videoconferencing technology has advanced to the point where an uncompressed signal equivalent to 36.5M bit/sec can be squeezed down to 128K bit/sec with acceptable picture quality. That's a 325-to-1 compression ratio. This high ratio means users can conduct a videoconference using fairly inexpensive dial-up lines.

Meanwhile, the price of codecs has continued to drop. Major U.S. codec vendors Compression Labs, Inc. (CLI) of San Jose, Calif., GPT Video Systems of Stamford, Conn., and PictureTel Corp. of Peabody, Mass., now sell codecs offering this level of compression at a reasonable price — about $30,000 per unit.

Declines in the prices of codecs are significant because codecs are the heart of videoconferencing systems.

Codecs take analog video signals from a television camera and audio signals from a microphone, sample them, digitally encode and compress them, and then transmit them over the public network, dedicated lines or satellite links (see Figure 1, page 30).

When the compressed signals are received by another codec, the process of compression is reversed. The digital signal is turned back into analog, and the end result is the voice and image displayed and heard on a TV.

ILLUSTRATION ©1991 GREG MACKEY

The combination of relatively low equipment prices and transmission costs leads to a fairly quick return on investment for videoconferencing systems. User companies are reporting payback periods of two years or less when purchasing videoconferencing systems (see "Comparing the costs of videoconferencing, travel," page 38).

As an added advantage to users, low-bandwidth codecs allow videoconferencing to be used in a dial-up environment rather than using dedicated lines as previous systems required. This makes videoconferencing a much more pervasive technology.

Users no longer need dedicated facilities for the systems. In fact, they can place an entire videoconferencing system on a cart, roll it to any location with public switched phone circuits and simply dial up another user.

Along comes the standard

Last November, the Consultative Committee on International Telephony and Telegraphy approved a standard for videocon-

(continued on page 30)

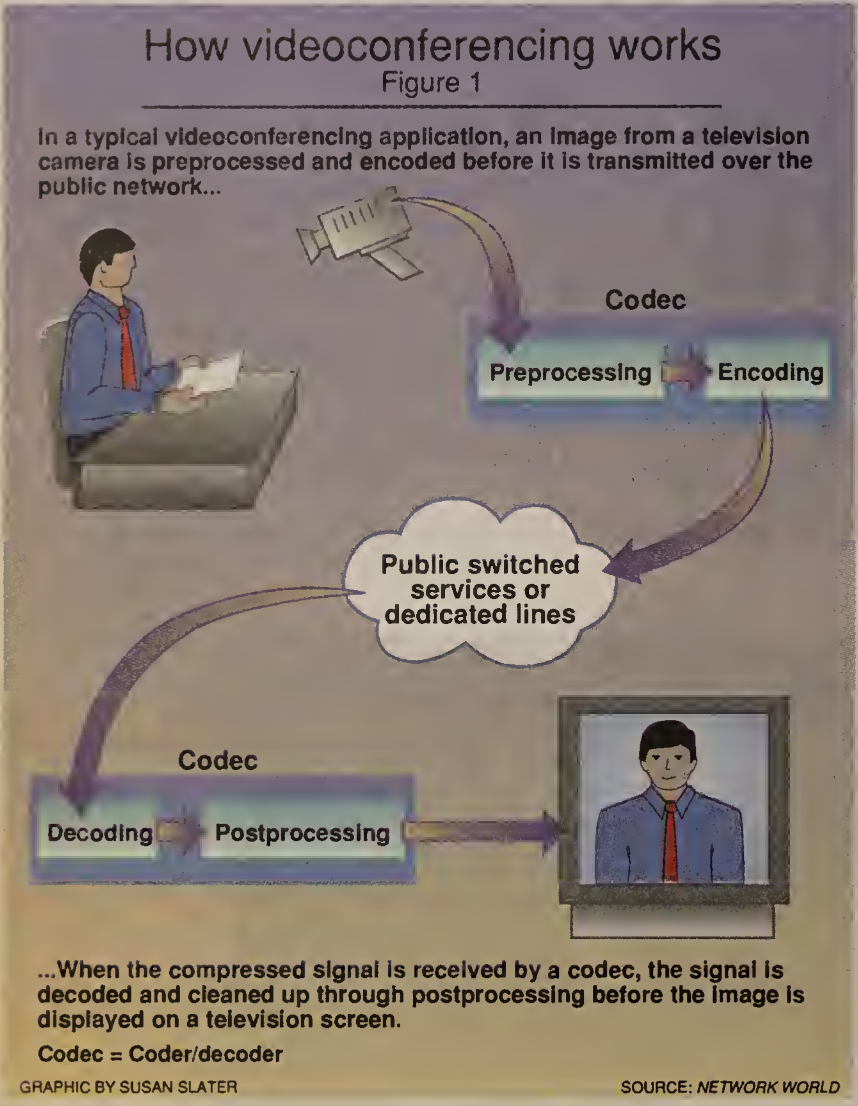
Salamone is Network World's *features writer.*

By SALVATORE SALAMONE

(continued from page 29)

ferencing codecs — CCITT H.261, commonly called Px64.

Some analysts say this standard will ease users' fear of equipment incompatibility and, therefore, lead to a boom in videoconferencing use. However, the standard still lacks some important features. The audio portion of a videoconference is not covered by the standard, for example.



How videoconferencing works

Figure 1

In a typical videoconferencing application, an image from a television camera is preprocessed and encoded before it is transmitted over the public network...

...When the compressed signal is received by a codec, the signal is decoded and cleaned up through postprocessing before the image is displayed on a television screen.

Codec = Coder/decoder

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

Even so, the positive factors — lower costs, ease of use and the idea of an international standard for interoperability — seem to outweigh the negatives. The indication from users is that videoconferencing is no longer just for large corporations.

"Today, you don't have to be a Fortune 500 company to use videoconferencing," says Robert Mitro, vice-president of sales and marketing at PictureTel.

Indeed, videoconferencing's lower costs allow the technology to be used by smaller companies and organizations that could not afford it a few years ago.

For example, Jersey City State College in Jersey City, N.J., uses a low-bandwidth videoconferencing system based on PictureTel's 3100 codecs for what they call "distance learning" applications, a program in which students from Jersey City State College and a nearby community college take the same course using the system.

"When selecting the system, transmission costs were very important to us," says Dorothy Mulligan, coordinator of academic computing and educational technology at Jersey City State College. Mulligan estimates that her average monthly cost for the system is $300 or about $7 per hour for two switched 56K bit/sec lines.

Mulligan expects to reduce this cost when Integrated Services Digital Network service becomes available.

"We're looking at ISDN 128K bit/sec service," Mulligan says. "We expect our transmission costs will drop to about $50 to $60 per month when we switch to a single ISDN line." That's about an 80% savings over what the college is paying now.

While striving to keep transmission costs low, the college also required good picture quality. Many people have a misconception about the quality of the picture that low-bandwidth systems can produce.

"We had one person visit who said he wanted to wait for high-definition television before using videoconferencing," Mulligan says. "That was until he saw one of our classes in session."

Others agree that today's systems are acceptable.

"People underestimate user acceptance of picture quality at the lower bandwidths," says Robin Rather, director of future technology at Vienna, Va.-based research firm Information Strategies Group.

You may get lower picture quality with a 128K bit/sec system than with a 384K bit/sec system. "But users are willing to accept the lower quality for the significant transmission cost savings," Rather says.

In fact, user satisfaction with low-bandwidth systems has turned the videoconferencing market upside down in the past few years.

"Today, all the action is at the lower bandwidths," Rather says. For instance, according to statistics compiled by Stamford, Conn.-based Gartner Group, Inc., 90% of the videoconferencing units shipped last year were low-end products.

Buyer beware

While low-bandwidth systems are hot, users should be wary of a potential problem. If you use Px64 compression algorithms at low bandwidths, the picture quality will not be as good as that obtained by proprietary schemes, according to John Walsh, executive vice-president of sales and marketing at CLI.

Codecs using proprietary schemes at low bandwidths have better picture quality because they make more efficient use of the available bandwidth, according to PictureTel's Mitro. For example, they do not need to allocate bandwidth for compressed video in multiples of 64K bit/sec (see Figure 2, this page).

The Px64 standard has additional deficiencies. It does not address the audio portion of a videoconference, nor does it cover multipoint conferencing or encryption of the signal (see "Groups attempt to upgrade standard," this page).

Users are interested in encrypted and multipoint videoconferencing today, according to Rather, and they are not waiting for standards to be completed.

For instance, Walsh pointed out that most customers new to videoconferencing want multipoint right away. "They are accustomed to multipoint teleconferencing, and they want to do the same thing with videoconferencing," he says.

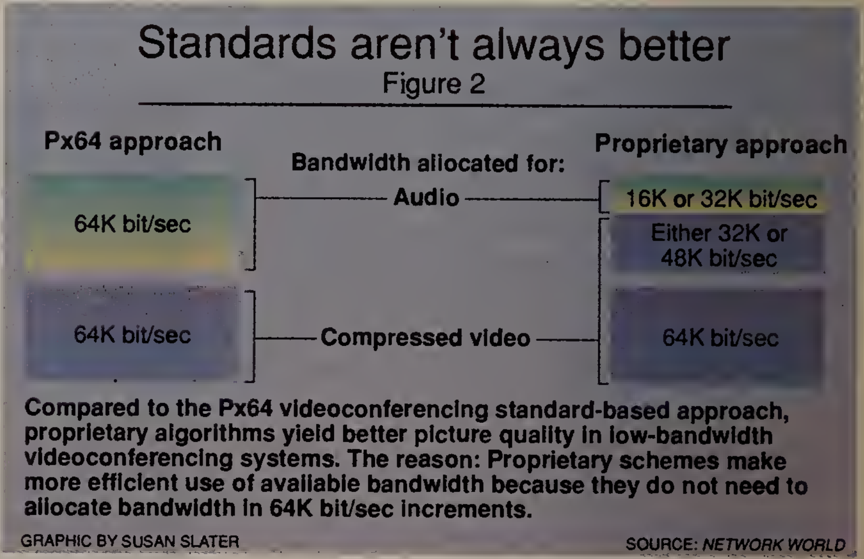
One firm not waiting for multipoint standards is Northern Telecom, Inc. In March, the company announced an agreement with PictureTel in which Northern Telecom will purchase up to 50 PictureTel System 4000 videoconferencing systems and several multipoint control units for use on its corporate network.

"We're now in the position to make videoconferencing readily accessible throughout the corporation," says Don Sproule, Northern Telecom's director of network planning.

Northern Telecom has used high data rate videoconferencing in point-to-point applications for several years. Switching to the multipoint application would drive system usage up and greatly increase transmission times. To arrive at a reasonable break-even point, the system has to use low-bandwidth videoconferencing, according to Sproule.

Standards aren't always better

Figure 2



Compared to the Px64 videoconferencing standard-based approach, proprietary algorithms yield better picture quality in low-bandwidth videoconferencing systems. The reason: Proprietary schemes make more efficient use of available bandwidth because they do not need to allocate bandwidth in 64K bit/sec increments.

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

"Using the System 4000, which runs over a dial-up digital network, our transmission costs have been lowered to $30 per hour from $400 per hour with our previous system," he says.

Another company singing the praises of multipoint videoconferencing is The Southern Co., which is the parent firm of several utility companies and an investment firm all located in the Southeast.

Southern Co. bought seven video compression codecs and a central Multipoint Control Unit from GPT Video Systems. The system provides videoconferencing services between the headquarters of five operating companies and Southern Co. offices in Atlanta and Birmingham, Ala.

The system operates at T-1 rates over the company's private network. "The system allows for meetings to be arranged with short notice and also allows specialists to be called in at short notice to contribute to discussions," says John Myers, director of information network services at Southern Company Services, a subsidiary of Southern Co. He notes that the reduction of travel and the more efficient use of executives' time will mean that the system will shortly pay for itself.

Similar to multipoint applications, encrypted videoconferencing is growing in usage in both the private and military sectors.

(continued on page 38)

Groups attempt to upgrade standard

When CCITT H.261, the international videoconferencing standard, was approved in November 1990, many videoconferencing analysts said it would do for videoconferencing what the Group III standard did for facsimile. It would turn an interesting technology into a mass market product.

But there is a big difference between H.261 and Group III fax. The Group III standard is detailed enough so that a manufacturer of facsimile equipment can make a unit that sends a complete fax document. H.261 leaves out a vital part of a videoconference — the sound.

"The standard only addresses video," says Robert Mitro, vice-president of sales and marketing at Peabody, Mass.-based videoconferencing systems vendor PictureTel Corp.

H.261 standardizes the way video coder/decoders (codec) decode a compressed video signal. This is accomplished by using a discrete cosine transform, motion-compensated, differential pulse code modulation algorithm.

However, H.261 does not deal with the voice side of the videoconference, nor does it cover multipoint conferencing or encryption of the videoconferencing signal.

Tackling the problem

Several working groups within the CCITT are attempting to improve the situation. But the process will take time, probably about two years, according to videoconferencing experts familiar with the committees.

Working groups are developing standards in several areas. The working group for encryption — which has not yet received an official CCITT designation — and the working group for multipoint videoconferencing (CCITT AV.231) have started work and should have the standards for these two aspects of videoconferencing approved by the end of 1992, Mitro says.

Additionally, a standard for 16K bit/sec compressed audio for use in videoconferencing is under development by CCITT Working Group AV.254. This group, like the committees working on the encryption and multipoint standards, expects to have its standard adopted by the end of 1992, Mitro says.

When these elements are brought into H.261, industry analysts believe that all the major features needed to make videoconferencing popular at last will have been standardized.

"It's likely that by the end of 1992, we'll see agreement on these standards," Mitro says. "And by 1993, you'll see vendors implement the standards into products."

— *Salvatore Salamone*

There are things about buying a networking system that most people don't know when they buy one.

Critical things.

So we've written a booklet, "Things they don't tell you at Novell presentations."

You'll find information no one else will give you. Information about technology unique to Banyan and advantageous to you.

This booklet will show you opportunities–and pitfalls–you may be unaware of now:

Distributed Architecture.

Why Banyan can offer you almost effortless growth. And the others can't.

The Man Trap.

Why competitive network operating systems require more and more LAN administrators. And Banyan doesn't.

Hidden Costs.

This part will make your hair stand on end.

Banyan has been refining its VINES® networking products for years. Our solutions are stronger, broader, and more cost-effective than anything else out there. So,

-if you're buying a networking system for the first time...

-if you're expanding...

-if you're wondering why you need so many people to manage the system you have now...

-if you're presently considering only Novell...

...Please call the toll-free number below for immediate delivery of your free booklet or to arrange a demonstration.

BANYAN®

Networking. Without Limits.™

Please send this coupon to:
BANYAN, 120 FLANDERS ROAD, WESTBORO, MA 01581

NAME

TITLE

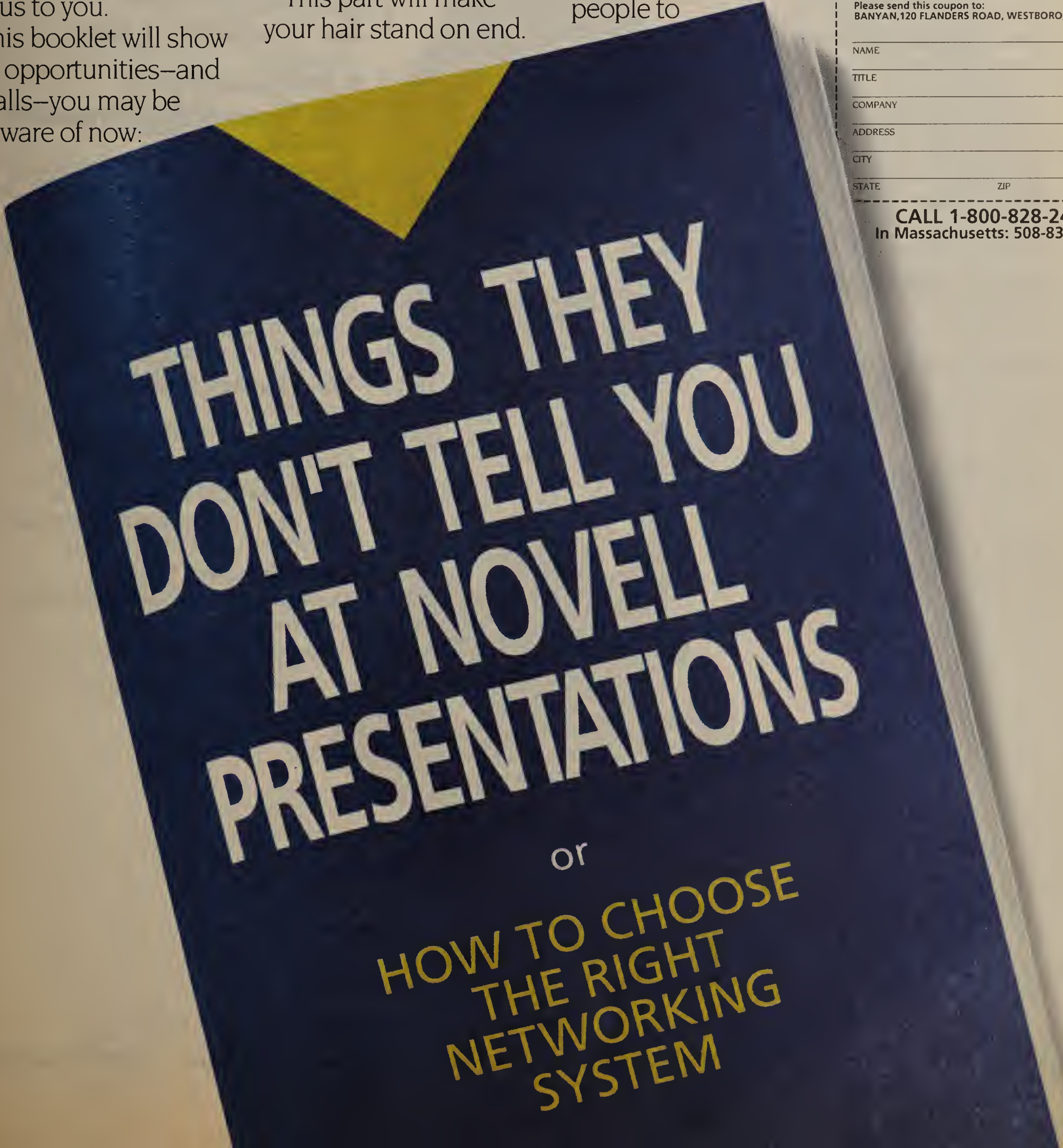
COMPANY

ADDRESS

CITY

STATE ZIP

CALL 1-800-828-2404
In Massachusetts: 508-836-2828


THINGS THEY DON'T TELL YOU AT NOVELL PRESENTATIONS
or
HOW TO CHOOSE THE RIGHT NETWORKING SYSTEM

Enterprise Networkings'

Mark Of Excellence

1991 ENNE Judges

Mr. Curtis Abraham
Staff Technical Consultant
System One Corporation

Mr. Roger Bender
Vice President
Citicorp

Mr. Todd Booth
Network Manager
Quotron Systems, Inc.

Mr. Dean Crutchfield
MIS Supervisor
AMOCO Chemical Corporation

Ms. Cheryl Currid
President
Currid & Company

Mr. Frank Dzubeck
President
Communications Network Architects

Mr. Howard Frank
Chairman
Network Management, Inc.

Mr. Mark Freund
President and CEO
Interconnect Network Consulting Group, Inc.

Mr. Steve Gross
Conference Director
NetWorld '91

Mr. Theodore Klein
President
Boston Systems Group

Mr. Steven Papermaster
President and CEO
Business Systems Group, Inc.

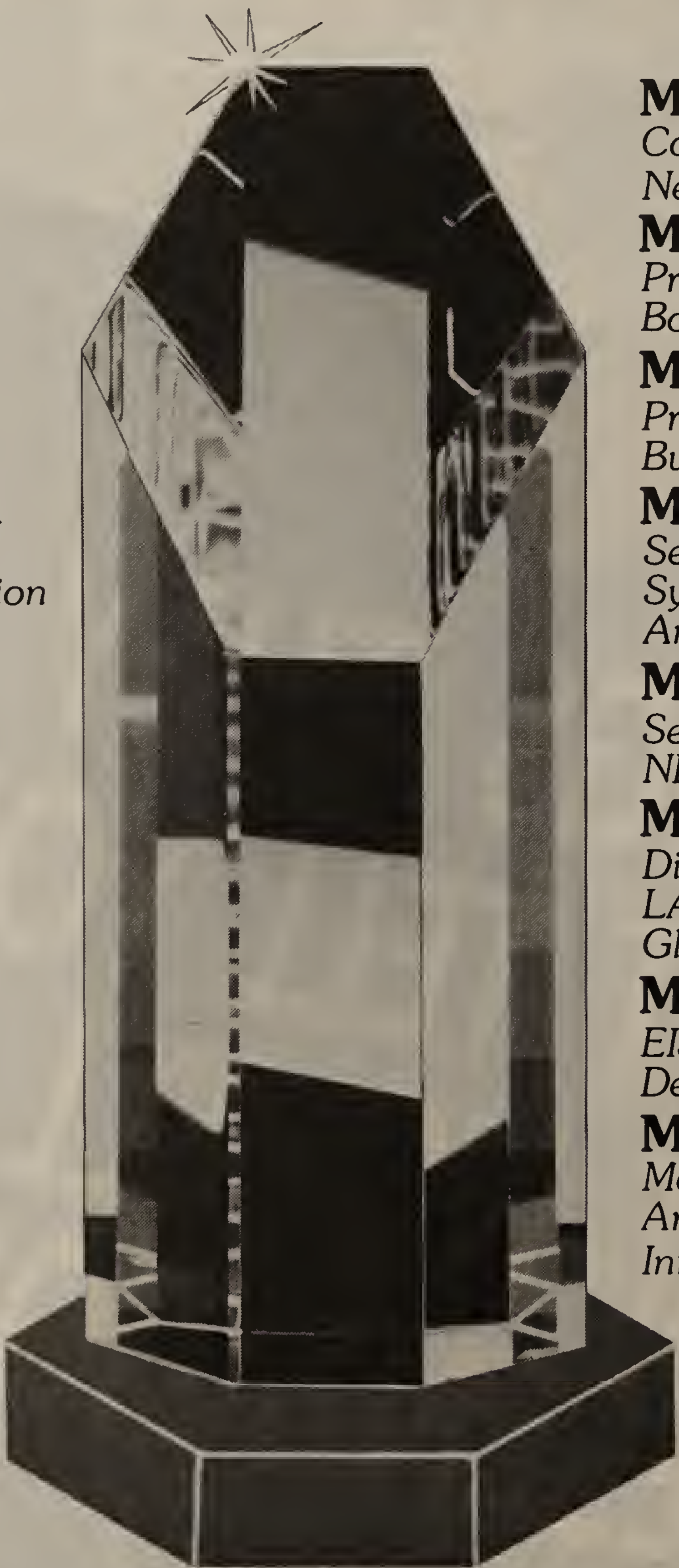
Mr. Mohsen Shahpar
Senior Manager
System Integration & Tech Center
Andersen Consulting

Mr. Eric Smalley
Senior Editor, Local Networking
NETWORK WORLD

Mr. Daniel Spiner
Director of
LAN Product Marketing
Glasgal Communications, Inc.

Mr. Harvey Summers
EIS Coordinator State of Missouri
Department of Public Safety

Mr. Richard Villars
Manager - Computer Networking Architecture
International Data Corp.



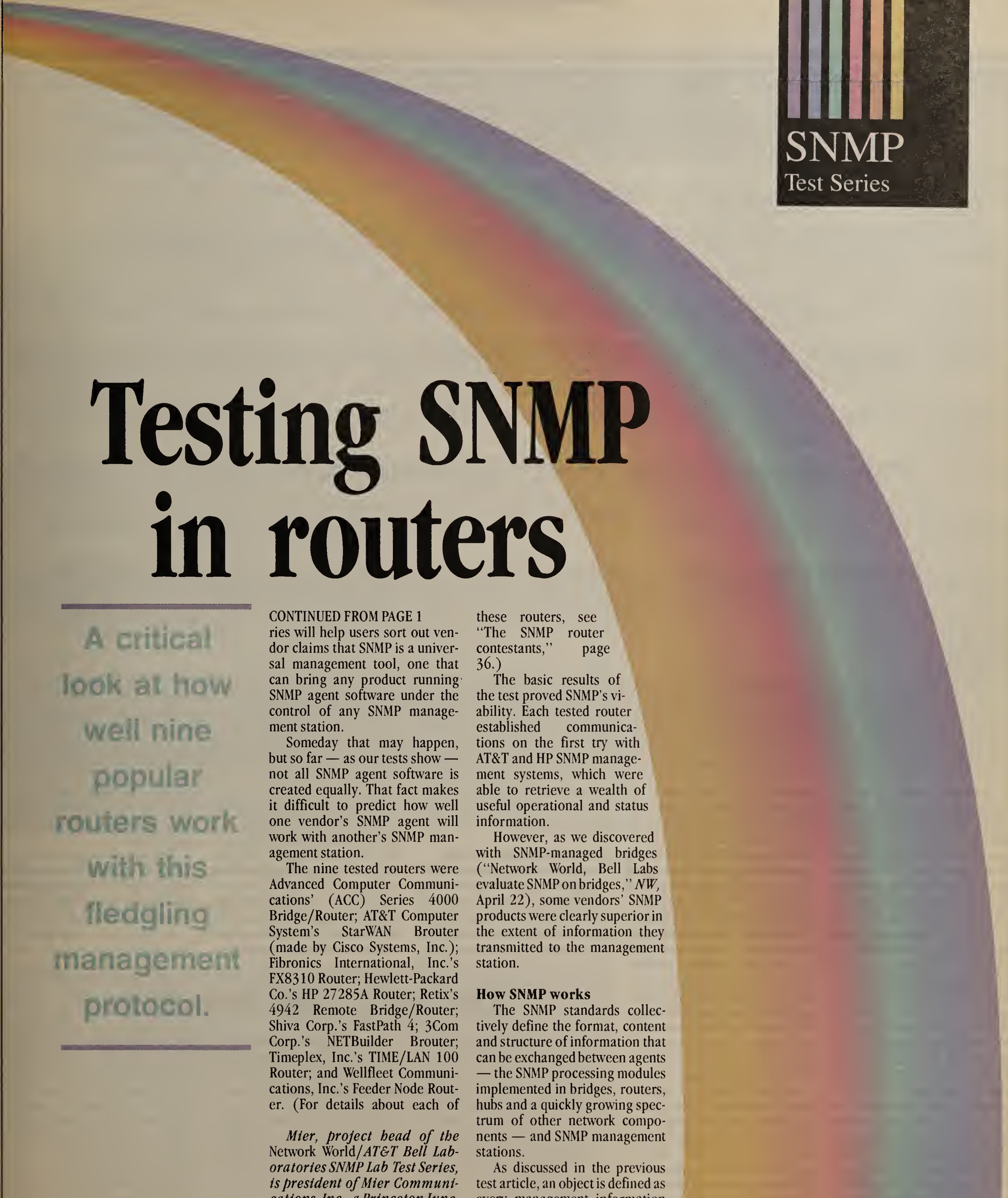
The Search Continues.

THE ENNE℠ AWARDS
Honoring The Best Of The Best.

Judging of the 1991 Nominations is under way. Winners will be named Monday, October 14th, at NetWorld '91.

THE ENNE AWARDS PROGRAM 305 Madison Avenue, Suite 1424, New York, NY 10165 212 983-4965

SNMP
Test Series



Testing SNMP in routers

A critical look at how well nine popular routers work with this fledgling management protocol.

CONTINUED FROM PAGE 1

ries will help users sort out vendor claims that SNMP is a universal management tool, one that can bring any product running SNMP agent software under the control of any SNMP management station.

Someday that may happen, but so far — as our tests show — not all SNMP agent software is created equally. That fact makes it difficult to predict how well one vendor's SNMP agent will work with another's SNMP management station.

The nine tested routers were Advanced Computer Communications' (ACC) Series 4000 Bridge/Router; AT&T Computer System's StarWAN Brouter (made by Cisco Systems, Inc.); Fibronics International, Inc.'s FX8310 Router; Hewlett-Packard Co.'s HP 27285A Router; Retix's 4942 Remote Bridge/Router; Shiva Corp.'s FastPath 4; 3Com Corp.'s NETBuilder Brouter; Timeplex, Inc.'s TIME/LAN 100 Router; and Wellfleet Communications, Inc.'s Feeder Node Router. (For details about each of these routers, see "The SNMP router contestants," page 36.)

The basic results of the test proved SNMP's viability. Each tested router established communications on the first try with AT&T and HP SNMP management systems, which were able to retrieve a wealth of useful operational and status information.

However, as we discovered with SNMP-managed bridges ("Network World, Bell Labs evaluate SNMP on bridges," *NW,* April 22), some vendors' SNMP products were clearly superior in the extent of information they transmitted to the management station.

How SNMP works

The SNMP standards collectively define the format, content and structure of information that can be exchanged between agents — the SNMP processing modules implemented in bridges, routers, hubs and a quickly growing spectrum of other network components — and SNMP management stations.

As discussed in the previous test article, an object is defined as every management information item with which SNMP can work,

(continued on page 34)

Mier, project head of the Network World*/AT&T Bell Laboratories SNMP Lab Test Series, is president of Mier Communications, Inc., a Princeton Junction, N.J.-based communications consultancy.*

NETWORK WORLD

Variance in routers' SNMP support

Vendor	Router	Management connection: Could SNMP managers access router's SNMP agent and retrieve basic router-oriented SNMP management data?	Router status reporting: Could manager obtain clear SNMP status, configuration and address information on router and all interfaces?	MIB II support: Did agent respond to SNMP queries for objects defined in the newer MIB II?	Ability to set values: Was the manager able to remotely change the values of agent's SNMP read-write objects?	Trap response: After an unexpected power interruption, did the router issue the appropriate SNMP trap alarm message?
Advanced Computer Communications **Santa Barbara, Calif.** **(805) 963-1941**	Series 4000 Bridge/Router, software Version 3.0	Yes. Two routers were linked back-to-back via a T-1 rate link; both routers' agents could be accessed, but only the local router's agent was tested.	Yes. However, interface descriptions could be more explanatory (such as reporting "Serial T-1 link" rather than "J3").	No. Responses indicated agent did not support MIB II objects.	Yes. For MIB I objects and most of the vendor's private MIB objects that we tested.	Partially. Agent issued a "link up" message after 1.7 min, but not the "cold start" message expected.
AT&T Computer Systems **Morristown, N.J.** **(800) 247-1212**	StarWAN Brouter (from Cisco Systems, Inc.), software Version GS-8.1	Yes.	Yes. However, interface descriptions (Ethernet 0, 1) don't align with SNMP index numbers, such as Interface 1 and 2.	No. Responses indicated agent did not support MIB II objects.	Yes. For MIB I objects we tested; very few of the vendor's private MIB objects are read-write.	Yes. Agent issued "cold start" trap message about 0.3 min after power restoral.
Fibronics International Inc. **Hyannis, Mass.** **(508) 778-0700**	FX8310 Router, software Version 4.2	Yes. interfaces on this router are labeled consistently with SNMP index numbers and interface descriptions.	Yes. However, vendor implements the same physical (MAC-layer) address for different LAN interfaces.	No. Responses indicated agent did not support MIB II objects.	Yes. Agent requires that manager use private community access for set operations.	No. Agent issued a trap message, but it contained a format error and was not recognized by managers as the expected trap.
Hewlett-Packard Co. **Fort Collins, Colo.** **(303) 229-3800**	HP27285A Router, Version 5.4.3 of Wellfleet router software	Yes.	Yes. Responses were accurate and clear.	No. Responses indicated agent did not support MIB II objects.	No. Unable to set the values of any objects tested.	Yes. Agent issued the expected "cold start" trap message about 1 min after power restoral.
Retix **Santa Monica, Calif.** **(213) 399-2200**	4942 Remote Bridge/Router, software Version 1.32.1	Yes. Two routers were linked back-to-back via a 2M bit/sec link; both router agents could be accessed, but only the local router's agent was tested.	Partially. Configuration and interfaces clearly delineated, but operational status of serial link was reported incorrectly.	No. Responses indicated agent did not support MIB II objects.	Yes. For MIB I objects tested.	Partially. Agent issued "warm start" and "link up" messages after about 1.5 min, but not the "cold start" trap expected.
Shiva Corp. **Cambridge, Mass.** **(617) 252-6300**	FastPath 4, software Version 8.1.1	Yes. However, unit was not configured for IP routing; this limited the scope of SNMP functionality tested.	Yes. In addition, Ethernet and LocalTalk ports are effectively delineated.	No. Responses indicated agent did not support MIB II objects.	No. Unable to set the values of any objects tested.	No. Traps not currently implemented in this agent.
3Com Corp. **Santa Clara, Calif.** **(408) 764-5000**	NETBuilder Brouter, Version 3.0.65 beta software	Yes. Configured easily and quickly for the specified test environment.	Yes. Responses were accurate and clear.	Yes. Responses indicated full support for MIB II.	Yes. However, at least 1 MIB I read-write object was implemented as read-only, so it couldn't be set.	Yes. Agent issued the expected "cold start" message about 2.1 min after power restoral.
Timeplex, Inc. **Woodcliff Lake, N.J.** **(201) 391-1111**	TIME/LAN 100 Router, software Version 1.1	Yes. However, some setup and configuration procedures could be more clear and simplified.	Yes. For the most part; interface description, "Ethernet on a 82586," is somewhat cryptic.	No. Responses indicated agent did not support MIB II objects.	Yes. However, at least 1 MIB I read-write object was implemented as read-only, so it couldn't be set.	Yes. Agent issued the expected "cold start" message about 0.3 min after power restoral.
Wellfleet Communications, Inc. **Bedford, Mass.** **(617) 275-2400**	Feeder Node Router, software Version 5.50	Yes.	Yes. Responses were accurate and clear.	No. Responses indicated agent did not support MIB II objects.	No. Unable to set the values of any objects tested.	Yes. Agent issued the expected "cold start" message about 2.2 min after power restoral.

MAC = Media access control
MIB = Management Information Base
SNMP = Simple Management Network Protocol

SOURCE: MIER COMMUNICATIONS, INC., PRINCETON JUNCTION, N.J.

(continued from page 33)

whether it be the name of the person responsible for managing a device or the number of packets counted on a link. About 110 such objects are defined in Management Information Base (MIB) I. MIB II, containing about 220 objects, was recently approved by the Internet Engineering Task Force, SNMP's standards-setting body.

As with the bridge test, our objective in this test was to see whether different vendors' SNMP-managed routers would work with other vendors' SNMP management stations and how differently the various SNMP agents performed.

Our test environment was designed to simulate a large user organization's net management center and to determine how well various products could be integrated into an existing SNMP-managed, multivendor network.

Each router's SNMP capabilities were evaluated from three perspectives:

- **The scope of SNMP functionality.** Criteria included support for MIB II, the ability to write or set object values, and the ability to react to an alarm condition by issuing a standard message, called a trap, to the manager.
- **Consistency and accuracy of management and other statistics.** All SNMP agents are supposed to collect specific statistics, which they provide to the SNMP manager when queried.
- **The compatibility between agents and generic managers of each vendor's private MIB extensions, which are proprietary SNMP extentions that specify unique objects.** Of particular importance was whether each vendor's own extensions could be installed on a generic central-site SNMP management system and their ability to provide additional worthwhile management information.

Manager redundancy

As part of our test environment, two different SNMP management systems — AT&T Computer Systems' Systems Manager and HP's OpenView Network Node Manager 2.0 — were used. All the tests involving interaction between the management station and the router were replicated for each router. First, one manager performed the entire battery of tests, then the other. Only one SNMP manager was connected to the test local-area network at a time (see graphic, page 37).

We used two managers to ensure that any anomalies noted in the SNMP agents' responses to management station queries were indeed caused by the agent and not by the management system's misinterpretation of the response messages.

Router setup and testing

All the routers in our test were configured solely as Internet Protocol routers. The purpose of this was to produce a least common denominator configuration that all the tested routers could support.

In addition, bridging functions were turned off in the routers that also inherently performed bridging, thus ensuring that the routers were truly routing and not bridging.

Except for the products from ACC and Retix, which were remote models, the routers tested were attached to two distinct segments of the same Ethernet LAN. Each LAN segment was defined as a separate subnetwork within the same IP net.

The remote routers from ACC and Retix were configured differently. Two of their respective units were linked back-to-back via a T-1 serial connection.

Each of the two routers had its own SNMP agent. In both cases,

The test's SNMP managers

The two management systems used in this test — AT&T Computer Systems' Systems Manager and Hewlett-Packard Co.'s OpenView Network Node Manager 2.0 — represent the leading edge of "generic" Simple Network Management Protocol (SNMP) managers. These types of systems use SNMP to manage a variety of devices from different vendors and provide comprehensive support for all current SNMP standards and capabilities.

Both the AT&T and HP managers are Unix-based software systems, which can run on several different hardware platforms.

In our test, AT&T's Systems Manager ran on an AT&T 80386-based system under Unix System V Release 4.0. We used a Systems Manager software module that AT&T recently developed and plans to deliver to customers later this year.

This enhanced software automatically handles most of the reformatting needed to import and load vendors' Management Information Bases (MIB) that are in either of the two Internet Structure of Management Information (SMI) formats: the original Internet SNMP SMI standard, which is still the most popular SNMP format used for vendor-specific MIBs, and the newer Concise MIB SMI.

HP's OpenView Network Node Manager ran on an HP 9000 workstation under HP's adaptation of Unix System V, HP-UX. We used the recently announced Release 2.0 of the software, which includes some significant enhancements over the 1.1+ version that we used to test SNMP-managed bridges earlier this year ("Network World, Bell Labs evaluate SNMP on bridges," *NW*, April 22).

One of these enhancements, an MIB editing feature, helps the user identify and correct syntax problems in vendor-specific MIBs. This option enables a network operator with only a rudimentary knowledge of MIB object formats and SMI structures to solve syntax problems, which would otherwise prevent the MIB from being loaded into the SNMP manager.

— Edwin Mier

NETWORK WORLD

Router SNMP agent counts of interface-level traffic

Vendor	Router	Total octets received on LAN interface (1)	Packets received addressed to router (2)	Broadcast packets received (3)	Unknown-protocol packets received (4)	Errored packets received (5)
Advanced Computer Communications **Santa Barbara, Calif.** **(805) 963-1941**	Series 4000 Bridge/Router, software Version 3.0	Agent count: 15,500 +/- 500; evaluation: fair (consistent count, but low; not clear what traffic was omitted)	Agent count: 145; evaluation: good (apparently adds discarded unknown-protocol packets to this count, which is incorrect)	Agent count: 65; evaluation: excellent (consistently correct)	Agent count: 0; evaluation: poor (unknown-protocol packets not reported)	Agent count: 35; evaluation: excellent (consistently correct)
AT&T Computer Systems **Morristown, N.J.** **(800) 247-1212**	StarWAN Brouter, (from Cisco Systems, Inc.), software Version GS-8.1	Agent count: 19,000 +/- 500; evaluation: excellent (consistent count, within acceptable range)	Agent count: 145; evaluation: good (apparently adds unknown-protocol packets to the count)	Agent count: 65; evaluation: excellent (consistently correct)	Agent count: 0; evaluation: poor (unknown-protocol packets not reported)	Agent count: 35; evaluation: excellent (consistently correct)
Fibronics International Inc. **Hyannis, Mass.** **(508) 778-0700**	FX8310 Router, software Version 4.2	Agent count: 20,000 +/- 100; evaluation: excellent (consistent, accurate count)	Agent count: 120; evaluation: excellent (consistent, accurate count)	Agent count: 65; evaluation: excellent (consistently correct)	Agent count: 25; evaluation: excellent (consistently correct)	Agent count: 0; evaluation: poor (errored packets not reported)
Hewlett-Packard Co. **Fort Collins, Colo.** **(303) 229-3800**	HP 27285A Router, Version 5.4.3 of Wellfleet router software	Agent count: 20,000 +/- 100; evaluation: excellent (consistent, accurate count)	Agent count: 210; evaluation: fair (apparently adds broadcast and unknown-protocol packets to this count)	Agent count: 0; evaluation: poor (no count of broadcast packets)	Agent count: 0; evaluation: poor (unknown-protocol packets not reported)	Agent count: 35; evaluation: excellent (consistently correct)
Retix **Santa Monica, Calif.** **(213) 399-2200**	4942 Remote Bridge/Router, software Version 1.32.1	Agent count: 20,000 +/- 100; evaluation: excellent (consistent, accurate count)	Agent count: 180; evaluation: fair (apparently adds both errored and unknown-protocol packets to this count)	Agent count: 65; evaluation: excellent (consistently correct)	Agent count: 0; evaluation: poor (unknown-protocol packets not reported)	Agent count: 35; evaluation: excellent (consistently correct)
Shiva Corp. **Cambridge, Mass.** **(617) 252-6300**	FastPath 4, software Version 8.1.1	Agent count: 20,000 +/- 100; evaluation: excellent (consistent, accurate count)	Agent count: 145; evaluation: good (apparently adds unknown-protocol packets to the count)	Agent count: 55; evaluation: fair (consistent, reasonable, but incorrect count)	Agent count: 25; evaluation: excellent (consistently correct)	Agent count: 0; evaluation: poor (errored packets not reported)
3Com Corp. **Santa Clara, Calif.** **(408) 764-5000**	NETBuilder Brouter, Version 3.0.65 beta software	Agent count: 19,000 +/- 500; evaluation: excellent (consistent count, within acceptable range)	Agent count: 145; evaluation: good (apparently adds unknown-protocol packets to the count)	Agent count: 65; evaluation: excellent (consistently correct)	Agent count: 25; evaluation: excellent (consistently correct)	Agent count: 35; evaluation: excellent (consistently correct)
Timeplex, Inc. **Woodcliff Lake, N.J.** **(201) 391-1111**	TIME/LAN 100 Router, software Version 1.1	Agent count: 14,000 +/- 200; evaluation: fair (consistent count, but low; not clear what traffic was omitted)	Agent count: 120; evaluation: excellent (consistent, accurate count)	Agent count: 65; evaluation: excellent (consistently correct)	Agent count: 25; evaluation: excellent (consistently correct)	Agent count: 0; evaluation: poor (errored packets not reported)
Wellfleet Communications, Inc. **Bedford, Mass.** **(617) 275-2400**	Feeder Node Router, software Version 5.50	Agent count: 19,000 +/- 500; valuation: excellent (consistent count, within acceptable range)	Agent count: 210; evaluation: fair (apparently adds broadcast and unknown-protocol packets to this count)	Agent count: 0; evaluation: poor (no count of broadcast packets)	Agent count: 0; evaluation: poor (unknown-protocol packets not reported)	Agent count: 35; evaluation: excellent (consistently correct)

SNMP = Simple Network Management Protocol

FOOTNOTES:

(1) The test packet stream delivered a total of 23,290 octets on the LAN. After deducting 12 bytes per packet (8 for the preamble and 4 for the Frame Check Sequence, which are stripped off at the physical layer of the receiving LAN adapter and not passed on as part of incoming packet traffic), a net total of 20,350 octets should have been recorded by the SNMP agent as the "ifInOctets" object count.

(2) The "ifInUCastPkts" object count should have been 120 — the total of 4 test packet-stream types addressed to the physical address of the router under test, which normally should have been delivered to higher protocol layers within the router.

(3) The "ifInNUcastPkts" object count should have been 65 — the total of 2 test broadcast packet-stream types, which should have been delivered to higher protocol layers within the router.

(4) The "ifInUnknownProtos" object count. The test packet stream contained 25 packets with an invalid protocol type in the Ethemet header. These could not have been passed to a higher protocol layer within the router and would have been discarded.

(5) The "ifInErrors" object count. Thirty-five packets in the test stream had misaligned Frame Check Sequences. These would have been discarded, and this counter within the router's SNMP agent would have been incremented.

This chart reflects selected SNMP values obtained for objects in the Interface group of Management Information Base I. All values shown are the incremental values registered by device SNMP agents as a result of a 245-packet test traffic pattern, which comprised prespecified quantities of 8 different packet types designed to increment specific SNMP agent counters. All routers were sent the same test packet stream. This portion of the testing was repeated at least 4 times for each tested router, and the agent values were retrieved by 2 different SNMP management systems. The additional SNMP traffic that was generated by querying the agent for these values has been deducted from the above counts.

SOURCE: MIER COMMUNICATIONS, INC., PRINCETON JUNCTION, N.J.

the agent in the local router — the one connected to the LAN segment to which our test apparatus was attached — was the only one fully tested.

Background traffic

A key part of our testing involved retrieving specific SNMP-defined values that registered in the routers' SNMP agents. We used a controlled traffic test stream transmitted by the HP LAN analyzer.

To retrieve this information properly, we had to first prevent the routers from issuing intermittent background packet traffic. Many of the tested routers routinely issue all sorts of protocol packets in a normal environment.

By turning off bridging, for example, we also effectively disabled traffic related to the Spanning Tree Protocol.

Disabling protocols that generated spurious background traffic was a major undertaking. For example, turning off the Router Information Protocol (RIP) usually disabled the router's dynamic routing capability.

Subsequently, static routes were either programmed into the router for our rudimentary test configuration or RIP was allowed to run until the router learned all stations and routes, then was shut off just before our controlled-traffic testing.

Despite our efforts, three of the tested routers — those of AT&T/Cisco, Fibronics and Wellfleet — continued to issue some spurious background traffic. This traffic was usually short, proprietary protocol, link test or keep-alive packets and affected only the outbound SNMP counters of these three routers' SNMP agents.

> 3Com's offering did everything an SNMP agent could be expected to do.
>
> ▲▲▲

To compensate for the effect of this traffic, we had to make an adjustment in the counters. Using an HP 4972A LAN analyzer, we noted the frequency and size of these spurious packets, then adjusted the SNMP statistics we obtained from the router agents to remove them from the traffic counts.

This adjustment was an approximation, of course, but we believe we were able to be reasonably accurate. The outbound SNMP traffic count values — those affected by the spurious packet traffic — were omitted from the agent count statistics shown in the chart on page 36.

As a final check before testing, one of the management stations on the local LAN subnetwork issued an Internet Control Message Protocol PING request, a Transmission Control Protocol/Internet Protocol broadcast message through the router to a Unix node on the destination LAN subnetwork.

Sending this PING request ensured that the router was working appropriately and that the desired environment for our SNMP testing was in place.

And the winner is . . .

Were an award to be presented for the router SNMP agent that represented the most complete SNMP support, it would clearly go to 3Com's router, which the company just recently delivered.

3Com's offering did everything an SNMP agent could be expected to do, and it did it correctly. Given this set of criteria, the SNMP agents contained in the routers of AT&T/Cisco and Timeplex are also top-notch implementations.

One of the qualities that makes SNMP management so attractive is the relative clarity and succinctness of the standards. Every router SNMP agent, at a minimum, is supposed to track certain events, such as counting traffic that enters and leaves the router and then reporting these statistics to an SNMP management station when queried.

It turns out that not all router SNMP agents view the same events and traffic in the same light.

The two charts on this page and page 36 show the diversity of an agent's counting accuracy, given the same carefully constructed 245-packet test traffic stream.

Seven of the nine router agents correctly reported the total number of bytes received on a

(continued on page 36)

Special thanks to Frank Actis of Hewlett-Packard Co.'s Colorado Telecom Division in Colorado Springs for designing the special packet test stream used in this test phase; to Brian O'Keefe of HP's Colorado Networks Division in Fort Collins, Colo., for methodology design and problem solving; and, of course, to the co-leader of the SNMP test team, Fred Henry of AT&T Bell Laboratories in Lincroft, N.J.

Router SNMP agent counts of Internet Protocol traffic

Vendor	Router	Packets delivered to router's IP level (1)	Packets discarded due to expired Time-To-Live (2)	Packets discarded because no route exists (3)
Advanced Computer Communications **Santa Barbara, Calif.** **(805) 963-1941**	Series 4000 Bridge/Router, software Version 3.0	Agent count: 40; evaluation: excellent (consistently correct)	Agent count: 0; evaluation: poor (agent does not report expired, discarded packets)	Agent count: 5; evaluation: excellent (consistently correct)
AT&T Computer Systems **Morristown, N.J.** **(800) 247-1212**	StarWAN Brouter (from Cisco Systems, Inc.), software Version GS-8.1	Agent count: 40; evaluation: excellent (consistently correct)	Agent count: 0 (reported 4 times) or 45 (reported twice); evaluation: fair (agent intermittently counts, or doesn't count, these packets)	Agent count: 6 (reported 5 times) or 5 (reported once); evaluation: good (nearly accurate, but count was often slightly off)
Fibronics International, Inc. **Hyannis, Mass.** **(508) 778-0700**	FX8310 Router, software Version 4.2	Agent count: 20; evaluation: fair (consistent, but incorrect; unclear what agent counts)	Agent count: 45; evaluation: excellent (consistent, accurate count)	Agent count: 5 (reported twice) or 35 (reported 4 times); evaluation: inconclusive (possibly improper configuration)
Hewlett-Packard Co. **Fort Collins, Colo.** **(303) 229-3800**	HP 27285A Router, Version 5.4.3 of Wellfleet router software	Agent count: 40; evaluation: excellent (consistently correct)	Agent count: 45; evaluation: excellent (consistent, accurate count)	Agent count: 3 (reported 3 times) or 9 (reported twice); evaluation: fair (reasonable counts, but inaccurate and inconsistent)
Retix **Santa Monica, Calif.** **(213) 399-2200**	4942 Remote Bridge/Router, software Version 1.32.1	Agent count: 37; evaluation: good (consistent, but slightly less than the correct amount)	Agent count: 0; evaluation: poor (agent does not report expired, discarded packets)	Agent count: 80; evaluation: inconclusive (possibly improper configuration)
Shiva Corp. **Cambridge, Mass.** **(617) 252-6300**	FastPath 4, software Version 8.1.1	Agent count: 40; evaluation: excellent (consistently correct)	Agent count: 45; evaluation: excellent (consistent, accurate count)	Agent count: 0; evaluation: inconclusive (configuration did not enable count to be properly tested)
3Com Corp. **Santa Clara, Calif.** **(408) 764-5000**	NETBuilder Brouter, Version 3.0.65 beta software	Agent count: 40; evaluation: excellent (consistently correct)	Agent count: 0; evaluation: poor (agent does not report expired, discarded packets)	Agent count: 5 (reported 2 times) or 6 (reported 3 times); evaluation: good (correct or off by a single packet)
Timeplex, Inc. **Woodcliff Lake, N.J.** **(201) 391-1111**	TIME/LAN 100 Router, software Version 1.1	Agent count: 0; evaluation: poor (agent reported only SNMP queries in this count)	Agent count: 0; evaluation: poor (agent does not report expired, discarded packets)	Agent count: 5; evaluation: excellent (consistently correct)
Wellfleet Communications Inc. **Bedford, Mass.** **(617) 275-2400**	Feeder Node Router, software Version 5.50	Agent count: 40; evaluation: excellent (consistently correct)	Agent count: 45; evaluation: excellent (consistent, accurate count)	Agent count: 2; evaluation: fair (consistent, but inaccurate)

SNMP = Simple Network Management Protocol

FOOTNOTE:

(1) The "ipInDelivers" object count. Forty of the 245 test-stream packets should have been delivered to the router's IP layer for processing — addressed to the router's IP address.

(2) The "ipInHeaderErrors" object count. Forty-five packets sent to the router (addressed to a destination on a distant subnetwork) had a 0 Time-To-Live value in the IP header. These should have been discarded — not forwarded — and this count incremented appropriately.

(3) The "ipOutNoRoutes" object count; should have been 5. Five packets of the test stream were sent to an invalid network address, which was unknown to the router and could not have been learned. Anomalies in this count with Fibronics and Retix indicate possible misconfiguration of their routers for the test environment. The results subsequently are considered inconclusive. Shiva's FastPath 4 was configured to route between an Ethernet and an Apple Computer, Inc. AppleTalk LAN. This count could not have been adequately tested since the destination subnetwork and device was running AppleTalk, not IP. The FastPath router was, therefore, not performing as an IP router which would have required loading TCP/IP on the LocalTalk Macintoshes.

This chart reflects selected SNMP values obtained for objects in the IP group of Management Information Base I. Values shown are the incremental values registered by device SNMP agents as a result of the same 245-packet test traffic pattern that generated the interface values in the chart "Router SNMP agent counts of interface-level traffic." Again, the additional SNMP traffic that was generated by querying the agent for these values — which affected just the "ipInDelivers" count — has been deducted from the above counts.

SOURCE: MIER COMMUNICATIONS, INC., PRINCETON JUNCTION, N.J.

(continued from page 35)

particular LAN interface. However, when we broke that incoming traffic down into component packets, the agents started to disagree on what happened.

Here's how we uncovered the differences. We issued a special test packet stream designed by Frank Actis of HP's Colorado Telecom Division. The test stream contained varying amounts of eight different packet types. So no matter what counts the SNMP agent reported, it would be possible to analyze the counts the agent was reporting, how packet types were being counted and what was being miscounted.

Six of the eight packet types were addressed to the local media access control (MAC) address of the router, which had to be reprogrammed in our test gear every time we tested a different router. Two packet types were MAC-level broadcasts, which are received automatically by all the nodes on the same LAN segment, including the router being tested.

According to a strict application of SNMP standards, each of the different packet types should have increased certain SNMP agent counters by the number of packets received. Each of the routers correctly counted and reported some of the packet values, but each of the agents incorrectly reported at least one value.

Among the more interesting findings were the responses from the management station to the test transmissions of several intentionally flawed packet types: 35 with a misaligned MAC-layer frame check sequence, 25 with an indisputably invalid MAC-layer protocol type field and 45 packets with an IP time-to-live field set to 0 that the IP-processing layer of the router should have discarded.

None of the router SNMP agents counted everything correctly. The best performers — 3Com and Fibronics — correctly reported on five of the eight traffic counts.

Next best in terms of accuracy were the results turned in by the SNMP agents of ACC, AT&T-Cisco, HP, Shiva, Timeplex and Wellfleet, all of which correctly scored four out of eight.

Five out of eight router SNMP agents failed to count the packets that had expired — that is, with a time to live of 0. This is an IP-header value that is decremented by each intermediate processing node. For example, if a packet with a time-to-live value of 10 passed through nine nodes, it would have a value of one remaining when it reached the 10th router.

This feature prevents packets with an invalid IP address from circulating around the network forever. Our results indicate that some of the routers forwarded expired packets.

Variability in SNMP support

While the SNMP agents in all the tested routers worked — enabling both management stations to communicate with the agent and retrieve fundamental management data — there were significant differences.

As shown in the "Variance in routers' SNMP support" chart on page 34, the column heading "Router status reporting" lists some of the anomalies or particularly laudable results.

Except for a single erroneous status that Retix's agent reported, all the routers presented good, accurate summaries of their configuration and the address and status of their active in-

The SNMP router contestants

This *Network World*/AT&T Bell Laboratories test examined the following nine routers:

- **The Series 4000 Bridge/Router** from Advanced Computer Communications (ACC) of Santa Barbara, Calif. The router's Simple Network Management Protocol (SNMP) agent was part of a new software release, Version 3.0, that ACC recently issued.
- **The StarWAN Brouter** from AT&T Computer Systems of Morristown, N.J. This product is actually a Cisco Systems, Inc. router that AT&T resells. The StarWAN's SNMP agent is part of Version 8.1 of Cisco's software, which AT&T currently ships with the StarWAN Brouter. (Cisco is reportedly already shipping Version 8.2 with the routers it sells.)
- **The FX8310 Router** from Fibronics International, Inc. of Hyannis, Mass.
- **The HP 27285A Router** from Hewlett-Packard Co. of Fort Collins, Colo. While the router's hardware platform is HP's own design, the operating software, including the SNMP agent, is derived from Bedford, Mass.-based Wellfleet Communications, Inc.'s router software, which is licensed by HP.
- **The 4942 Remote Bridge/Router** from Retix of Santa Monica, Calif. Retix participated in our earlier bridge test with a beta release, Version 0.2, of its agent software. The agent tested in this phase was part of Retix's Version 1.32.1 production software, which we found has been substantially improved.
- **The FastPath 4** from Shiva Corp. of Cambridge, Mass. Shiva acquired the FastPath line from Novell, Inc., which developed the operating software including the SNMP agent. The private Management Information Base extensions developed by Novell were submitted by Shiva for our testing.
- **The NETBuilder Brouter** from 3Com Corp. of Santa Clara, Calif. 3Com also participated in our earlier bridge test, which evaluated a different SNMP agent implementation, part of 3Com's Version 4.0 bridge software.
- **The TIME/LAN 100 Router** from Timeplex, Inc. of Woodcliff Lake, N.J.
- **The Feeder Node Router** from Wellfleet Communications.

— Edwin Mier

NETWORK WORLD

SNMP agent-manager compatibility

Vendor	Router	Able to load vendor-specific MIB on HP's OpenView Network Node Manager ?	Was manager able to invoke/access selected private MIB objects?	Able to load vendor-specific MIB on AT&T Computer Systems' Systems Manager?	Was manager able to invoke/access selected private MIB objects?
Advanced Computer Communications, Santa Barbara, Calif. (805) 963-1941	Series 4000 Bridge/Router, software Version 3.0	Yes, on first attempt; manager adjusted for a logical error that was contained in the MIB.	Yes. All objects tested, including sets, worked and provided good data.	Yes, after about an hour; a logical error was found, which had to be corrected before MIB would load.	Yes. All objects tested, including sets, worked and provided good data.
AT&T Computer Systems, Morristown, N.J. (800) 247-1212	StarWAN Brouter (from Cisco Systems, Inc.), software Version GS-8.1	Yes, on first attempt.	Some. Agent returned no response for others; a read-write object could not be set (only 3 objects out of several hundred were read-write).	Yes, on first attempt.	Some. Agent returned no response for others; a read-write object could not be set (only 3 objects out of several hundred were read-write).
Fibronics International, Inc. Hyannis, Mass. (508) 778-0700	FX8310 Router, software Version 4.2	Yes, after about an hour; 3 minor syntax corrections were required.	Yes. All objects tested worked and provided good data.	Yes, after about an hour; 5 minor syntax corrections were required (including the same ones required on HP system).	Yes. All objects tested worked and provided good data.
Hewlett-Packard Co. Fort Collins, Colo. (303) 229-3800	HP 27285A Router, Version 5.4.3 of Wellfleet router software	Yes, on first attempt.	Very few to test; private objects for IP environment are proprietary and not SNMP-accessible. Objects for other protocols are not accessible on agent unless they are running on router.	Yes, after minor format editing required by manager.	Limited; the 6 accessible objects were all read-only (no sets supported) and did not offer much usable management information.
Retix Santa Monica, Calif. (213) 399-2200	4942 Remote Bridge/Router, software Version 1.32.1	Yes, after about 2 hours; many minor syntax corrections were required.	No. No values were returned by the agent for most of the objects tested.	Yes, after about 2 hours; many minor syntax corrections were required.	No. No values were returned by the agent for most of the objects tested.
Shiva Corp. Cambridge, Mass. (617) 252-6300	FastPath 4, software Version 8.1.1	Yes, in about 10 min; 2 minor syntax corrections were required.	Yes, most; however, numerous Apple Computer, Inc. AppleTalk objects were inaccessible because of IP configuration.	Yes, on first attempt, after minor format editing required by manager.	Yes. Most worked and provided good data (as with HP manager, AppleTalk objects were inaccessible).
3Com Corp. Santa Clara, Calif. (408) 764-5000	NETBuilder Brouter, Version 3.0.65 beta software	No private MIB submitted.	NA	NA	NA
Timeplex, Inc. Woodcliff Lake, N.J. (201) 391-1111	TIME/LAN 100 Router, software Version 1.1	After about 2 hours of editing on HP manager, we were able to load a corrected version of vendor's MIB that was ported over from the AT&T manager.	Yes. All objects tested, including sets, worked and provided good data.	Yes, after about 2½ hours; numerous syntax corrections required (involving mainly MIB tables and sequences).	Yes. All objects tested, including sets, worked and provided good data.
Wellfleet Communications, Inc. Bedford, Mass. (617) 275-2400	Feeder Node Router, software Version 5.50	Yes, on first attempt.	Very few to test; private objects for IP environment are proprietary and not SNMP-accessible. Objects for other protocols are not accessible on agent unless they are running on router.	Yes, on first attempt, after minor format editing required by manager.	Limited; the 6 accessible objects were all read-only (no sets supported) and did not offer much usable management information.

IP = Internet Protocol
MIB = Management Information Base
NA = Not applicable
SNMP = Simple Network Management Protocol

SOURCE. MIER COMMUNICATIONS, INC., PRINCETON JUNCTION, N.J.

terfaces. The objects queried here were from the System and Interface Group of MIB I, which all SNMP-supporting devices are obliged to maintain and report.

We also found that surprisingly few of the routers' agents support the newer MIB II set of standard objects. Agents with MIB II objects are being worked on and are due to be released by the end of this year or early next year.

> Five of the routers correctly responded by issuing the expected cold-start trap message.

▲▲▲

In addition, existing SNMP agents respond differently when the management station attempts to change the values of specific objects stored on the router.

Key to the ability to set values is the SNMP provision for community names, which are basically password settings within SNMP agents that prevent unauthorized access.

A manager must include in each SET request the community name that matches the setting in the agent.

Most SNMP agents can be set up with a community name of "public," which generally gives any management system unrestricted access for setting SNMP values.

For first-time SNMP network implementations, it is a good idea to set all agents and managers to the public community name. The alternative is to constantly reset the management system with different community names depending on which particular device is being accessed.

The Fibronics router had a shortcoming in that it did not support public community access for changing SNMP values via SET commands. This required that we reset our managers to a community name that would be accepted for SET access. In Fibronics' case, the community name "private" was required. Network managers would be best served if all SNMP agents supported the public community name as a default.

Of the roughly half-dozen trap conditions defined in SNMP documents, the one we chose to test was a cold start, which we caused by pulling the power plug from the router and then plugging it back in after a few moments. This is perhaps the most disruptive test that we could have devised.

Despite this tough test, five of the routers correctly responded by issuing the expected cold-start trap message after they powered back up. The interval from power restoration until issuance of the trap message varied from as little as 20 seconds (AT&T-Cisco and Timeplex) to more than two minutes (Wellfleet).

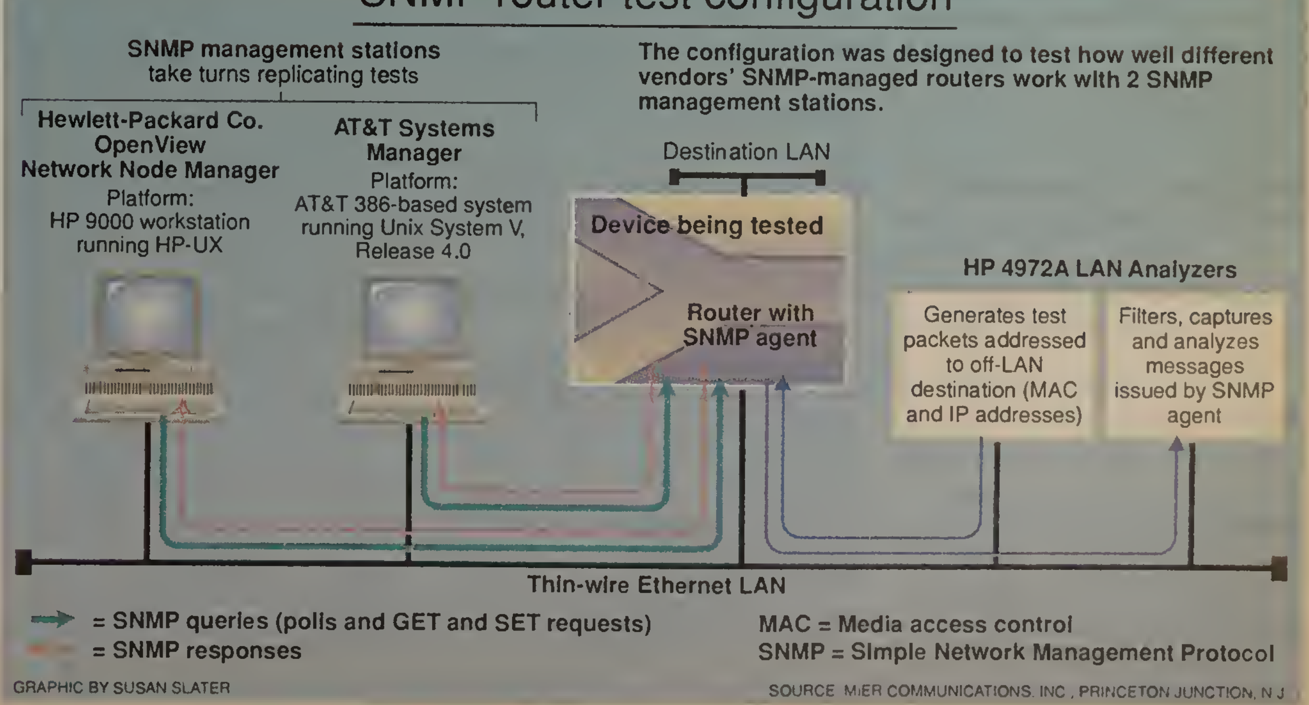
Private MIB loading

The table on this page summarizes our findings regarding the ability of vendors' private MIB extension objects to be installed in the two different management systems we used. Eight of the nine router vendors submitted private MIBs to us for this test. Only 3Com didn't because it does not currently ship a private MIB extention.

As noted earlier, recent enhancements to both HP's and AT&T's management systems, which were not available to us for the earlier bridge testing, greatly facilitated installing and loading private MIBs. In fact, all were

(continued on page 38)

SNMP router test configuration


SNMP management stations
take turns replicating tests
Hewlett-Packard Co. OpenView Network Node Manager
Platform: HP 9000 workstation running HP-UX
AT&T Systems Manager
Platform: AT&T 386-based system running Unix System V, Release 4.0
Destination LAN
Device being tested
Router with SNMP agent
HP 4972A LAN Analyzers
Generates test packets addressed to off-LAN destination (MAC and IP addresses)
Filters, captures and analyzes messages issued by SNMP agent
Thin-wire Ethernet LAN

The configuration was designed to test how well different vendors' SNMP-managed routers work with 2 SNMP management stations.

➔ = SNMP queries (polls and GET and SET requests)
➔ = SNMP responses

MAC = Media access control
SNMP = Simple Network Management Protocol

GRAPHIC BY SUSAN SLATER

SOURCE. MIER COMMUNICATIONS, INC., PRINCETON JUNCTION, N.J.

Fine-tuning the videoconference

continued from page 30

"Videoconferencing established itself as a battlefield tool during [Operation Desert Storm]," Rather says. She notes that there was a significant amount of encrypted videoconferencing among senior-level Pentagon officials during the Persian Gulf War.

Corporations are also turning to encrypted videoconferencing to ensure trade secrets are not intercepted by competitors. For example, a pharmaceutical company requiring anonymity for strategic advantage uses encrypted videoconferencing when developing a new product.

The company, which has several laboratories scattered throughout the U.S., routinely discusses trade secrets and marketing strategies over the encrypted videoconferencing system.

For the pharmaceutical company, use of the videoconferencing system has reduced the time needed to develop new products and bring them to market.

What lies ahead?

Companies using multipoint and encrypted videoconferencing are reaping the benefits of such systems without the benefit of standards. Should users wait for the standards to be completed? Probably not.

Even where there is a standard (Px64), there is only tacit support for it from vendors. For example, while vendors say their equipment supports the Px64 standard, Px64 algorithms are used as a last resort in most cases.

When codecs start the signal handshaking process, they first check to see if the codec on the other end of the line has the same proprietary algorithms. If not, the codec will "step down" to the Px64 algorithms in much the same way modems step down to lower speeds when dissimilar units are communicating.

In some cases, Px64 is the third, instead of the second, algorithm in the step-down process.

Vendors can justify offering the standards-based option as a second- or third-tiered approach to videoconferencing because, as mentioned before, their proprietary schemes offer better picture quality at low bandwidths than the standards-based approach. However, they may be dragging their feet in support of new standards that will improve the situation.

It will be at least another 18 months before the multipoint, encryption and audio standards for videoconferencing are approved by the CCITT. "This gives U.S. manufacturers a break," says Tim McElgunn, an analyst at Datapro in Delran, N.J.

Videoconferencing is one high-technology area that is dominated by U.S. manufacturers. However, Japanese firms are poised to enter the market, and lack of a more complete standard is an inhibitor to them, according to McElgunn.

The growth of the low-end videoconferencing market makes it an attractive arena to the Japanese. A standard set of compression algorithms would allow Japanese codec developers to put the routines in silicon on a chip, rather than use software. "The Japanese are well known for putting [such routines] into silicon," McElgunn says.

Some Japanese electronics manufacturers have been spurred on by the existing standard, but they will not go into full production until the standards are complete, he adds.

For users looking to buy videoconferencing equipment, the choice is to wait two years for products that meet the new standards — at possibly lower cost if the Japanese enter the market — or buy existing products that offer support for current, yet deficient, standards.

Since users are claiming two-year payback periods with today's products, network managers can bring their firms into the videoconferencing era and recoup their initial investment just as the products supporting the new standards are coming to market. That seems like perfect timing.

Comparing the costs of videoconferencing, travel

Videoconferencing has long been touted as a big cost saver because it reduces travel expenses. Actual savings will vary for each company, depending on how much travel is being eliminated.

Generally, companies can recoup their initial investment in a low bandwidth videoconferencing system — one that operates at 128K bit/sec — within two years of nominal use, users said. For example, a company headquartered in New York can use the money saved by eliminating weekly teleconferences, as well as monthly trips by its marketing and engineering departments to its research laboratory in Silicon Valley, to buy videoconferencing equipment that would allow these face-to-face meetings to take place without the travel hassles.

In the example, public relations staff in California must meet with three marketing managers in New York to plan a product roll-out strategy, while engineers in California must meet with the vice-president of engineering in New York to update product development for one hour each week. In the past, the staff held weekly teleconferences, and the three marketing managers and the vice-president made monthly trips to the West Coast.

In comparing the approximate costs of videoconferencing and travel, let's begin by estimating the onetime costs for the former:

- Two 128K bit/sec coder/decoders (one for each site) for a total of $60,000.
- Camera equipment, televisions, microphones and other ancillary equipment for both locations. While users say the cost for this equipment varies from $15,000 to $20,000 per site, we choose the higher figure.
- Recurring costs for two 64K bit/sec circuits that depend on long-distance call volume, the long-distance carrier used and the time of day the videoconferencing calls are made (rates vary from $7 to $20 per hour for each circuit). Using the higher cost, the total yearly circuit costs for two hours of conferencing time per week is $4,160. The two-year cost of videoconferencing includes the $100,000 for equipment and $8,320 for two years of circuits costs, totaling $108,320.

The yearly travel costs are:

- A total of 48 round-trip airline tickets (four a month for 12 months). There are a wide range of airfares, but a typical New York to San Francisco round-trip ticket is about $700, bringing the total to $33,600 a year.
- Hotel. With an average stay of two nights and the single-room rate at a medium priced hotel being $125 a night, the cost for four people to spend two nights a month for 12 months is $12,000.
- Food. Give each person $35 per day for two days in California and one day traveling. The total for four people, three days per month for a year is $5,040.
- Other expenses include car rentals, cabs and airport parking. If they rent a sub compact car (about $40 per day for three days) in San Francisco and drive to Silicon Valley. Total cost for the year: $2,880 plus gas, tolls and other incidentals, or $3,000. Thus, the total cost for travel per year is $53,640, or $107,280 for two years.

In this estimate, the figures for travel are conservative, while those for videoconferencing erred on the high side. Still, the figures show that the videoconferencing system pays for itself in less than two years.

SNMP tests

continued from page 37

eventually installed into both systems.

The Cisco MIB, submitted by AT&T for the StarWAN Brouter, was the least difficult and quickest to load. Most of the others had some syntax errors — some obscure and others blatant — that prevented their installion in one management system or the other.

The most troublesome of the private MIBs was Timeplex's, which required more than two hours of corrections for both systems.

In fact, rather than completely replicate the corrections on both systems, we made the corrections on the AT&T Systems Manager and then ported those corrections over to the HP system via the network. We also wanted to see if the corrections required on one manager were the same ones that needed to be fixed on the other. Apparently, they were.

The corrected MIB that we ported from the AT&T Systems Manager immediately loaded in the HP OpenView system.

Making choices

It is difficult, given the multifaceted testing we performed, to name a single SNMP agent implementation as the best. Some of the better routers have already been mentioned. But the needs of the user must still determine which is "best."

In using the test data to select a router, users should closely examine the aspects of the testing they consider to be the most important for their situation.

As noted, all of the router agents enabled both managers to immediately access them and retrieve good, reliable, management data. But all of the router agents tested erred to some degree in the way they count and report traffic statistics.

The traffic reporting accuracy of an SNMP agent is clearly crucial to a network manager. If a router agent does not spot or report that it has begun encountering packets of an unknown protocol — for example, errored or expired packets — then a serious condition affecting the health of the network could go unnoticed until it became too late.

As noted, 3Com's agent did more things right than many of its competitors, given our interpretation and application of the SNMP standards. But even 3Com's agent failed to report the receipt — and presumably the discard — of packets whose time-to-live value had expired.

All not created equal

The test results clearly show that even though SNMP works, not all agents are created equal. The flaws that were noted are likely to be addressed by the vendors in subsequent software releases.

The test results clearly show that even though SNMP works, not all agents are created equal.

▲▲▲

The SNMP state of the art is certainly advancing, however, and the process of correcting the glitches we found might be viewed as fine-tuning at this stage. The capability for mixed-vendor network management already exists via SNMP, and the standards on which it is built are unquestionably solid.

Need more details on SNMP or our test results? Two in-depth special reports will be available later this summer. The first is designed to aid network managers implementing SNMP. The second is oriented toward SNMP product developers and includes full SNMP product-by-product analyses and results of the entire test series.

For more information on either report, contact Mier Communications at (609) 275-7311.

Letters

continued from page 25

tions were a fantasy.

The arrival of new hardware and speech recognition companies with novel algorithms has renewed interest in this particular field.

At least one industry publication and one or more trade shows exist that are devoted exclusively to the subject of human/machine voice interaction.

As described in the article, the brokerage application seems to be limited in its use of speech recognition technology, which may actually lead to its success. However, it will remain a far cry from the continuous speech, speaker-independent, large vocabulary uses popularized in science fiction and envisioned by the field's early pioneers.

John Neubert
Director of academic computing
Drew University
Madison, N.J.

Send for free information

For more information on any of the products and services advertised in ***Network World's*** Action Center, circle the Reader Service Numbers on this card which correspond to the advertisements of interest to you.

Complete the coupon information and
mail to: NETWORK WORLD
The Newsweekly of Enterprise Networking Strategies

(July Expires Oct. 31, 1991)

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	
18	19	20	21	22	23	24	25	
26	27	28	29	30	31	32	33	
34	35	36	37	38	39	40	41	
42	43	44	45	46	47	48	49	
50	51	52	53	54	55	56	57	

Name____________________
Title____________________
Company____________________
Street____________________
City____________________
State__________Zip__________
Phone____________________

Send for free information

For more information on any of the products and services advertised in Network World's Action Center, circle the Reader Service Numbers on this card which correspond to the advertisements of interest to you.

Complete the coupon information and
mail to: NETWORK WORLD
The Newsweekly of Enterprise Networking Strategies

(July Expires Oct. 31, 1991)

1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25
26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41
42 43 44 45 46 47 48 49
50 51 52 53 54 55 56 57

Name____________________
Title____________________
Company____________________
Street____________________
City____________________
State__________Zip__________
Phone____________________

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 716 PITTSFIELD, MA

POSTAGE WILL BE PAID BY ADDRESSEE

NETWORK WORLD

The Newsweekly of Enterprise Networking Strategies

P.O. Box 5090
Pittsfield, MA 01203-9828

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 716 PITTSFIELD, MA

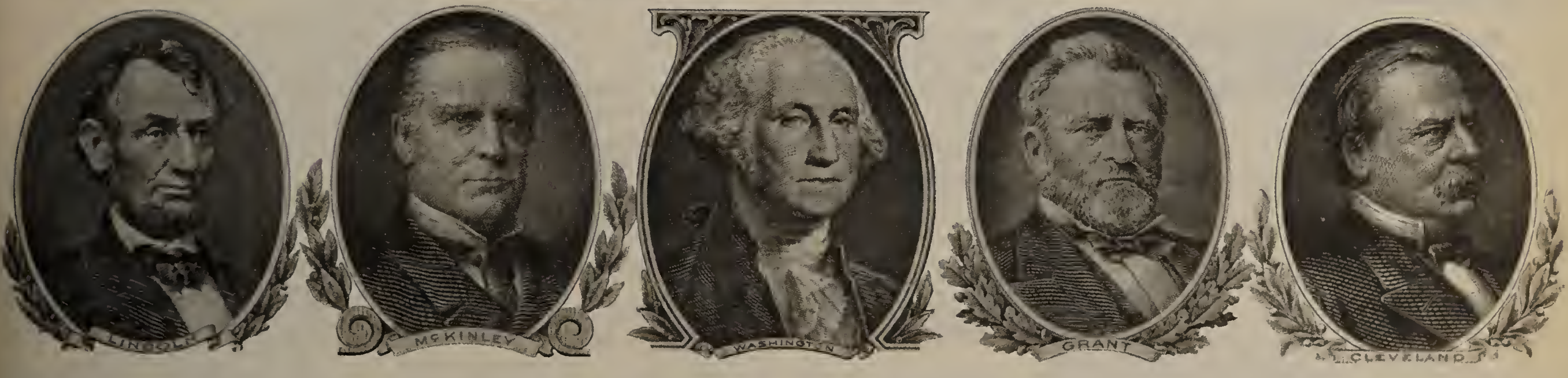
POSTAGE WILL BE PAID BY ADDRESSEE

NETWORK WORLD

The Newsweekly of Enterprise Networking Strategies

P.O. Box 5090
Pittsfield, MA 01203-9828

If we can't convince you to try *AT&T MEGACOM® WATS*, maybe these guys can.



Your savings on *AT&T MEGACOM WATS* outbound long distance service can really add up.

Sign up before September 2, 1991 and you can get $7,500 (or seven Clevelands and a McKinley) in free long distance service.

We'll also waive about $2,100 (a couple of Clevelands and Grants) in installation and start-up costs.*

And after that, you'll keep on seeing more and more of these guys.

Because if your business spends $3,800 or more a month in outbound long distance, *AT&T MEGACOM WATS* gives you AT&T's biggest WATS savings over basic long distance rates.

Usage Volume discounts, Term Plans and Multi-Location WATS Calling Plans are available to save you even more.

And these savings are just part of the story. *AT&T MEGACOM WATS* gives you the advanced technology of digital access. Plus all the advantages of the AT&T network.

Still not convinced? Then use at least $2,500 a month in *AT&T MEGACOM WATS* Long Distance Service for six months. If you're not happy, we'll pay** to switch you back to whatever long distance service you're using now.

So call 1 800 247-1212, ext. 407. Or return the coupon.

And keep more of these guys right where you want them.

In your pocket.

☐ Yes, I want $7,500 in free long distance service. Please contact me in time to take advantage of your incredible *AT&T MEGACOM WATS* "MEGA BUCKS" offer.

Name ______
Title ______
Company ______
Address ______
City ______ State ______ Zip ______
Telephone (______) ______
Current Long Distance Service ______
Monthly Spending ______

Mail this coupon to AT&T, PO Box 45038, Jacksonville, FL 32232-9974. Or call AT&T at 1 800 247-1212, ext. 407. Or *fax* this coupon to 1 800 248-2492. Offer expires Sept. 2, 1991. Service must be installed by Nov. 1, 1991.

NW701

© AT&T 1991

AT&T
The right choice.

---

*Service must be installed by 11/1/91. Applies to new or increased Term Plan usage.

**To take place within 30 days after the 6-month usage requirement is fulfilled.

56K CSU/DSU'S

Anderson Jacobson Breaks Another Price Barrier

Starting at $450⁰⁰

Model	DTE Speed Range	ASYNC/SYNC V.35/RS232	List Price
5610	56K	SYNC/V.35 only	$450⁰⁰
5615	9.6, 19.2, 56K	YES	$550⁰⁰
5620	1.2-56K	YES	$650⁰⁰
5625	1.2-56K	YES	$750⁰⁰
5630	1.2-56K	YES	$850⁰⁰
5640	9.6-38.4K	YES	$1050⁰⁰

CXR/Anderson Jacobson broke into the market with the first T1 ESF CSU for under $1,000⁰⁰. Today CXR/Anderson Jacobson introduces another astonishing value...56K CSU/DSU's starting at only $450⁰⁰. Each of the 5600 Series 56K CSU/DSU's are compatible with the various DDS services available. Models have fixed or variable rate line speeds and DTE speeds.

The AJ 5610, 5620, 5630 and 5640 have line speeds of 56K. The AJ 5615 and 5625 have line speeds of 9.6K, 19.2K or 56K. The 5630 is a dual port unit. The 5640 has four ports. All other models are single ports. Small, lightweight and aggressively priced starting at only $450⁰⁰.

For more information contact CXR/Anderson Jacobson or your local distributor. Call TOLL FREE (800) 537-5762 ext 263 or within California (408) 435-8520 ext 263.

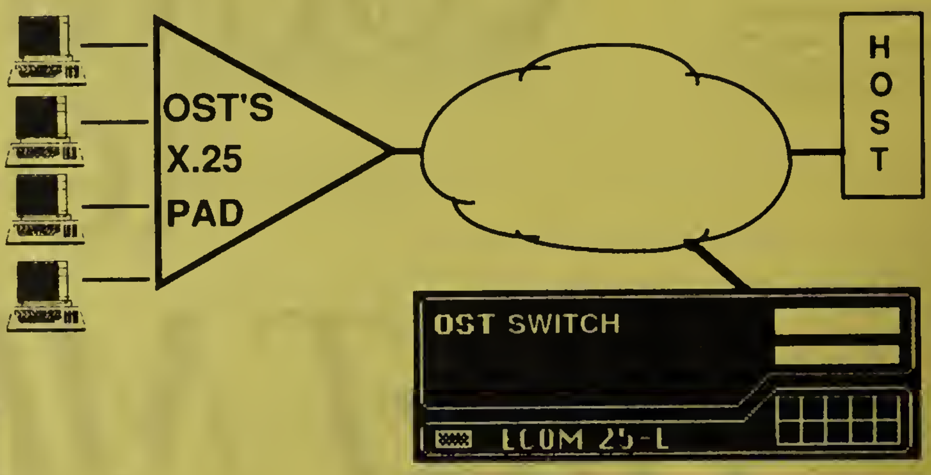
ANDERSON JACOBSON
- A CXR Company -

521 Charcot Avenue
San Jose, CA 95131
FAX(408)435-1276

Circle Reader Service No. 16

X.25 NETWORK CONNECTIVITY

THE X.25 CONNECTION:$995



PAD FEATURES:

Full support for CCITT (1984) X.25, X.3, X.28, X.29

Fully programmable PAD configured from any standard asynchronous terminal.

Expandable up to 16 asynchronous ports, offering a per port cost of only $137 per port.

SWITCH FEATURES:

Multiple protocol support: 1984 CCITT X.25, X.32, X.3, X.28, X.29, SNA/SDLC, VIP & BMAP

Configurable from 4 to 72 ports

High performance 16/32 bit multiprocessor switching up to 1000 pps

Electrical interfaces: V.24/V.28, RS-232C, X.21, V.11, V.35 and V.54/V.25 bis

SUPPORT:

Free 1 year warranty service provides 24 hour a day, 7 day a week customer service.

OST
NETWORKING INTELLIGENCE

For further information write or call:
OST, Inc.
14225 Sullyfield Circle
Chantilly, VA 22021

Tel: (703) 817-0400
FAX: (703) 817-0402
Modem: 703-817-0456, 2400 Bps;
703-817-9846, 9600 Bps, 8N1

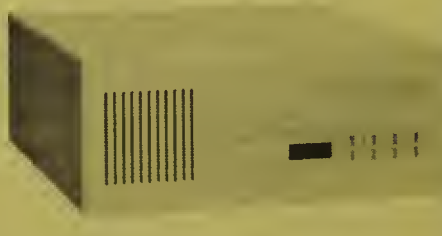
Circle Reader Service No. 17

ASC/BSC TO SNA

Need ASYNC/BISYNC - to - SNA Connectivity?

"SNA_Gate™ is the flexible approach..."

- Flexible yet powerful SNA access for a broad array of async, bisync 3270, and 3780/2780 RJE devices.
- Easily customized. SNA_Gate can be fine-tuned to optimize the performance of attached devices.
- Eliminates the overhead imposed by non-SNA devices in SNA environments. No more outdated emulation software in your FEP. No more special channel hardware.
- Supports multiple sessions per terminal, with "hot key" switching between sessions.
- Centrally configured and managed.
- Call today to learn how Netlink's SNA_Gate will *improve performance* and *reduce costs* in your SNA network!



NETLINK
INC

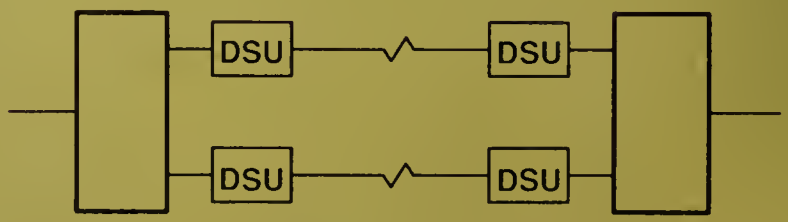
3214 Spring Forest Rd.
Raleigh, N.C. 27604
Ph: 1-800-NETLINK
Fax: 919-872-2132

Circle Reader Service No. 18

AUTOMATIC FALLBACK

Dual Digital Circuit Backup

Automatic Fallback Switching Between Two Dedicated Circuits



- Continuous testing of both channels with alarm outputs.
- Automatic switching on loss of channel in use.
- Models for RS-232, V.35, T1 and Analog data lines.

dataprobe

170 Coolidge Avenue Englewood, NJ 07631
Phone (201) 569-6464 Fax (201) 894 0939

Circle Reader Service No. 19

CABINETS AND ENCLOSURES

GUARANTEED SHIPMENT 10-14 DAYS:*

* Applies to standard product line.

- EMI/RFI Shielded Cabinets
- 3B2 and LAN Enclosures
- Custom Metal Fabrication
- Stock Cabinets 30″ to 84″ Height

Great Lakes Case & Cabinet Co., Inc.
P.O. Box 551/Edinboro, PA 16412
(814) 734-7303/Fax: (814) 734-3907

Circle Reader Service No. 32

DATACOMM MATRIX SWITCH

BLOCKED BY OLDER MATRIX SWITCH TECHNOLOGY?

Discover the *NEW DIMENSIONS* in Network Management Technology
With the *MTRX* Family of *TANDEM* Electronic Matrix Switches

MTRX-500	512 Ports
MTRX-4000	4096 Ports
MTRX-8000	8192 Ports

BENEFITS	MTRX	OTHERS
•Largest Non-Blocked Port Capacity...8192 PORTS	YES	NO
•Up To 98% Data Cable Reduction DTE to DCE	YES	NO
•4000 FT DTE TO DCE With Twisted Pair Cable	YES	NO
•LAN Based PC Control - Ethernet Or Token-Ring	YES	NO
•Multi-tasking (VM-386) Universal Workstation	YES	NO
•Integral BERG/BERT and S.A.M. Test Functions	YES	NO
•Non-Proprietary Database, dBASE III PLUS/IV	YES	NO
•Supports Data Rates To 2.048MBPS	YES	SOME

Over 30,000 Ports Installed At RBOCs and Fortune 1000 Companies

Datacomm Management Sciences Inc.
"The Responsive Ones"
25 Van Zant Street
East Norwalk, CT 06855
TEL: (203) 838-7183

dBASE III PLUS/IV are trademarks of Ashton-Tate Corporation

Circle Reader Service No. 2

COMMUNICATIONS SOFTWARE

WANG

Lightspeed

where Wang VS minis and the rest of the world intersect.

IBM · NEC · LEADING EDGE · Macintosh · HEWLETT PACKARD · AST RESEARCH INC. · COMPAQ · cc:Mail · BANYAN · NOVELL · 3Com · Da Vinci · UNIX

Circle Reader Service No. 3

MacSoft's Lightspeed family of products integrates DOS PCs, Windows PCs, Unix terminals, Macintoshes, and LANs with Wang's VS line of minicomputers.

Features: Terminal emulation, printer sharing, file transfers with automatic document conversions, transparent mail exchange, and more.

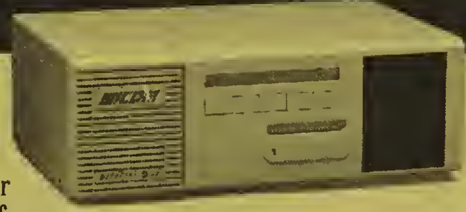
Get maximum integration and top speeds.

Call us today. (805) 324-4291

MacSoft
1800 19th Street
Bakersfield, CA

DATA/VOICE NETWORKING EQUIPMENT

WOULD YOU SPEND A DOLLAR TO SAVE THOUSANDS?



Install our award-winning Marathon 5K on your private network and save your company thousands of dollars on toll charges you currently pay the Phone Company.

By integrating voice and fax traffic onto low-speed (9.6 - 56/64 Kbps) leased lines with a Marathon 5K Data/Voice Network Server, you can send toll-free voice and fax to your remote sites. Data, voice, fax and LAN share the same line and your investment pays for itself in toll savings.

Can't fit it in your budget just now? To ease tight budgets in tough times, we're offering a leasing program that allows you to pay just $1 for our Marathon 5K after the term of your lease of 24 months or more.

Not bad for a buck. Call MICOM today and stop wasting money.

1-800-MICOM U. S. [1-800-642-6687]

MICOM®

Circle Reader Service No. 4

COMPLETE LAN SERVICE

BUY SELL OR REPAIR LAN HARDWARE

Complete LAN Service

We are a component (chip) level repair depot that buys and sells used or new LAN Hardware.

Hardware Specialties:
3 Com • Corvus • IBM • Interlan • Novell • Proteon • Standard Micro Systems (SMC) • Western Digital • Pure Data • Gateway • Thomas Conrad • Tiara & Others

LANFIX/LAN RECYCLERS

1-800 448-7420

FAX: 1-800 752-6958
PHONE: 1-801-226-1832
1378 West Center St. • Orem, Utah 84057

Circle Reader Service No. 5

Send For Free Info

NW July 91

For more information on any of the products and services advertised in *NetworkWorld's ActionCenter*, circle the Reader Service Numbers on this coupon which correspond to the advertisement of interest to you.

Complete the coupon information and mail to:
NetworkWorld
P.O. Box 5090, Pittsfield, MA 01203

Expires 10/31/91

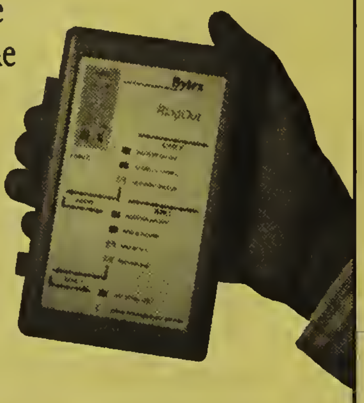
Name ______________________
Title ______________________
Company ______________________
Phone ( ) ______________________
Street ______________________
City ______________________
State ____________ Zip ____________

NW July 91

1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25
26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41
42 43 44 45 46 47 48 49
50 51 52 53 54 55 56 57

DIAGNOSTIC TEST EQUIPMENT

Get your hands on the most comprehensive Token Ring cable tester for only $1495.



Introducing the Bytex RingOut cable tester—the first designed specifically for Token Ring. And the easiest-to-use. ▪ Tests 4 and 16 Mbps STP and UTP LANs. ▪ Detects damaged or improperly installed cables or connectors. ▪ Confirms correct operation of MSAU. ▪ Detects and isolates beaconing nodes. ▪ Works on live LANs—no shutdown required. *Find out about our 30-day money back guarantee.*

Call 1-800-23-BYTEX for details now.

Bytex

Bytex is a registered trademark of Bytex Corp.

Circle Reader Service No. 6

ETHERNET NETWORK MONITORING SYSTEM

The Network Professor®

- **Multi-Segment** Ethernet/IEEE 802.3 LAN Monitoring System.
- Global Network Monitoring and from **ANY** Location.
- Monitors **ALL** LAN traffic conditions on every segment, for all Stations/Nodes and Protocols, **simultaneously**.
- Alarming for user defined thresholds and detection of error conditions, resulting in **decreased downtime costs**.
- **X-Motif or ANSI** user interface provides access to current and historical network statistics via a Relational Database.
- Complies with **ISO Standards** for Enterprise Management.
- Industry proven since 1989. (**CALL NOW** for Fortune 500 references.)

"...only fully functional LAN Monitoring System..."
Bill Hancock

For Literature and your **FREE** Evaluation Package
CALL (213) 379-2505
*Look for our NEW **4 port Local Bridge!***

TECHNICALLY ELITE CONCEPTS®

Circle Reader Service No. 7

DIAL-UP MANAGEMENT

Optimize Dial-up Modem Network Utilization

With CDI's Patented Network Windows™ Management System

CDI's PC based Dial-up Modem Network Management System has been field proven worldwide since 1983. Reduce your line costs and prevent client loss with these features:

- Modem vendor independent-works with any modem type
- Provides local reconfiguration from the keyboard
- Generates complete daily usage and error reports
- Automatic busy of "ring no answer"
- Central site management of a distributed network
- UL approved

Circle Reader Service No. 8

CDI - The Answer To Dial-Up Modem Management
Call or Write For Information & Demo Disk

Communication Devices Inc. • 1 Forstmann Ct. • Clifton, NJ 07011
Phone 201/772-6997 • Fax 201/772-0747 • 800/359-8561

CDI

ETHERNET TERMINAL SERVERS

Ask about our DECserver trade-in program!

Hot New Benchmark for Ethernet Terminal Servers

The Equinox ELS-48 rewrites the book on terminal server performance. Small in size but big on throughput, it gives you DECserver™ compatibility, crisp screen refresh, and keeps fast printers busy without penalizing keyboard response.

- Drive 48 ports at 38.4 Kbps *simultaneously!*
- As low as $125/port — major savings over DECserver
- Mount up to 48 ports in 3.5" — ¼ the space required by DECserver 300
- Enhanced command set cuts keystrokes
- Dual protocol (LAT & TCP/IP)
- 12, 24, 36 and 48-port configurations available
- High throughput design — ideal for file transfers and foreign host connections
- Full range of wiring options, control signals, RS-423 extended distance interface
- Thin or standard Ethernet connections
- Three Year Warranty

EQUINOX

Equinox Systems, Inc. • 14260 S.W. 119 Avenue • Miami, Florida 33186
800/275-3500 • 305/255-3500 • FAX 305/253-0003

Circle Reader Service No. 24

ESF CSUS

$500.00 CASH BACK

Upgrade to the reliability of Verilink Intelligent ESF CSU's and we will give you $500.00 cash back or credit towards your purchase. Take advantage of the leading manufacturer of ESF CSU's and the network management benefits of ESF now.

Call Us Today Toll-Free At
1-800-669-4278
For your *free* Verilink planning kit.

The Helfrich Company
19782 MacArthur Boulevard
Suite 310, Irvine, CA 92715

VERILINK

Circle Reader Service No. 10

FAST REMOTE APPLETALK

SyncRouter/LT • SyncRouter/LTi

Synchronous routers connecting remote Appletalk networks via switched or dedicated digital phone lines

Eliminate modem hassle. Because it uses digital lines that are six times faster than modems, the SyncRouter connects remote LANs in milliseconds, transmits with 99.75% accuracy, greatly reduces connect charges, and yields a 20Mb/hour throughput to efficiently handle any type, quantity or size file.

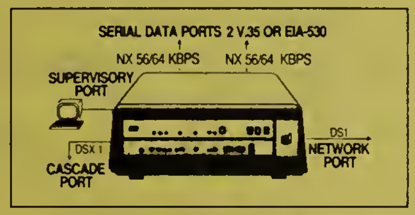
SyncRouter: The remote AppleTalk network solution for: corporate communications, resource sharing in education, fax replacment, multi-media file delivery, distance education and multi-user database access.

Engage Communication, Inc.
9053 Soquel Dr., #203 • Aptos, CA 95003 • 408-688-1021 • Fax: 408-688-1421 • AppleLINK: D3362

Circle Reader Service No. 25

FT-1 DSU/CSU

FT-1 CSU/DSU. MORE DIGITAL BANDWIDTH. LESS TO PAY.



The DataComm 552 is the data set for network applications requiring bandwidth from 56 Kbps to full T-1. It's the perfect interface for video teleconferencing, LAN to WAN, CAD/CAM, etc. Up to three DataComm 552's can be cascaded with other equipment such as a PBX. Ideal for expanding networks! Call 1-800-777-4005.

General DataComm

WORLD CLASS NETWORKING

CORPORATE / INTERNATIONAL HEADQUARTERS 203-574-1118 HONG KONG 852-833-6779 CANADA 416-498-5100
AUSTRALIA 61-2-956-5099 UNITED KINGDOM 44-734-774868 FRANCE 33-1-30570200 JAPAN 81-33-862-1730
Circle Reader Service No. 26

NETWORK SERVICES

SATNET

A Wholly Owned Subsidiary of The Associated Press

DOMESTIC & INTERNATIONAL

Satellite Data Broadcast
(U.S. - South America - Europe)

X.25 Packet Switching

Terrestrial Services

3rd Party Installation & Maintenance

Call us for a FREE consultation TODAY!

SATNET
50 Rockefeller Plaza
New York, N.Y. 10020
Tel. # (212) 621-7800
Fax # (212) 621-1512

COMNET WEST '91 BOOTH #638

Circle Reader Service No. 27

INTEGRATED TECH CONTROL

Access and Control Your Remote Tech Centers With Spectron NETWORKER™

NETWORKER automates and consolidates manual tech control facilities under centralized PC control. With NETWORKER you can access remote network nodes and perform a variety of tasks. Such as insert a remote DATASCOPE®, or similar protocol analyzer, to monitor line data. Or switch individual lines or groups for convenient sparing and fallback. You also can create extensive, qualified alarming tests. There's even a facility to view real-time lead status as time line traces.

TELENEX CORPORATION
A UNIT OF GENERAL SIGNAL

Spectron Tech Control Products
13000 Midlantic Drive • Mount Laurel, NJ 08054
800-222-0187 609-234-7900 609-778-8700 (FAX)

Circle Reader Service No. 28

PC BASED PROTOCOL ANALYZER

PC-based performance and protocol analysis that's as easy as pie.

The PA1 combines performance analysis with protocol analysis to help you diagnose problems and plan network evolution. Sophisticated histograms, pie charts and line graphs help you track performance parameters.

For protocol analysis, you can display layer 2 and layer 3 data for SNA, X.25, and QLLC.

Call us at (708) 574-3399.

Progressive Computing

Progressive Computing, Inc.
814 Commerce Drive
Oak Brook, IL 60521

Circle Reader Service No. 29

LAN

Tired of LANs Giving You The Silent Treatment?

Get Them Communicating With

HARRIS ADACOM

Complete Token-Ring Solutions!

* **Cabling Solutions:**
MAUs, Media Filters, Repeaters

* **Bridges:**
Local, Token-Ring, Ethernet
Remote, Token-Ring, Ethernet, SNA, 56K, T1

* **Gateways:**
Ethernet, SNA, TCP/IP, Token-Ring, Unix
Local and Remote

* **FDDI**

For answers to your connectivity needs, call

HARRIS ADACOM

1-800-3270-ADA

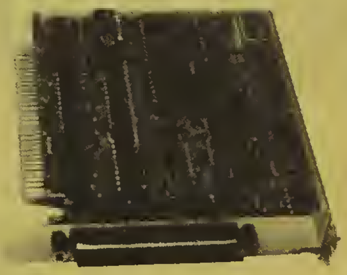
Circle Reader Service No. 30

PROTOCOL ANALYZER

Omni I/O™

PC Based Protocol Analyzer

FREE DEMO DISC



- Fast, friendly user interface. Excellent data visibility.
- Integrated data capture, analysis, DOS file storage. Named configurations, formatted print.
- Async, Sync, BOP's (SDLC, X.25, etc.), Transparent, ASCII, EBCDIC, IPARS, user defined.
- Fits PC, AT compatible, 386 and Laptop with standard bus and CGA, EGA or VGA.
- Programmable- API for unprecedented power and flexibility.

Circle Reader Service No. 31

COMPUTRONICS Romney, WV FAX 304-822-4508

P.O. Box 2040, 151-C Jersey Mt. Road, Romney, WV 26757 • 304-822-3086

SNMP MANAGEMENT

For SNMP Users, Implementers, Product Developers !

Two New, Comprehensive Special Reports on SNMP
Including: complete, exclusive results of
NetworkWorld/Bell Labs testing of dozens of SNMP-managed bridges, routers, hubs & concentrators

SNMP Implementers/Users Guide: SNMP product differences; buying SNMP-supporting devices; comparison of over 2 dozen SNMP management systems; procedures, tips for successfully managing enterprise-wide, mixed-vendor, SNMP network ... and more.
200-plus pages, single volume $495 (if ordered by 8/15)

SNMP Developers Guide: Includes: product-by-product analysis of SNMP agent implementation variations, common design flaws, testing methodology; by-vendor assessment of private MIBs; proposed MIB MIB standards; interoperability issues; product opportunities...and more.
400-plus pages, two volumes $1,895 (if ordered by 8/15)

Special pre-publication rates in effect for orders received by August 15; shipment of these orders guaranteed by September 1

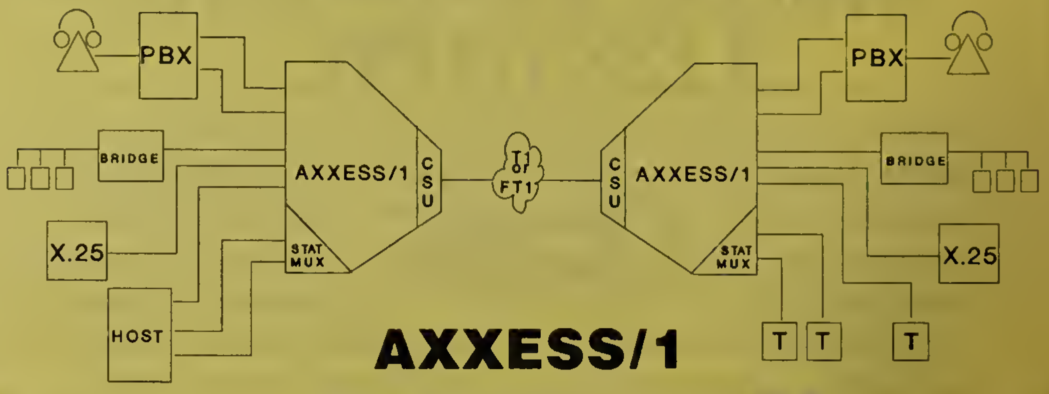
Mier Communications Inc.
99 Hightstown Rd., Princeton Junction, NJ 08540

For details, call:
609-275-7311
Circle Reader Service No. 20

T-1/FRACTIONAL T-1 MULTIPLEXER

FREE BANDWIDTH!

Reliable, Efficient, Cost Effective Multiplexer



AXXESS/1

- * High Bandwidth Efficiency - 99% + Useable
- * Integral Stat Mux
- * Quality Compressed Voice
- * Six Month Payback Typical

Dataproducts New England
50 Barnes Park North, Wallingford, CT 06492

Call 800-243-4485 or 203-265-7151
for details and local distributor

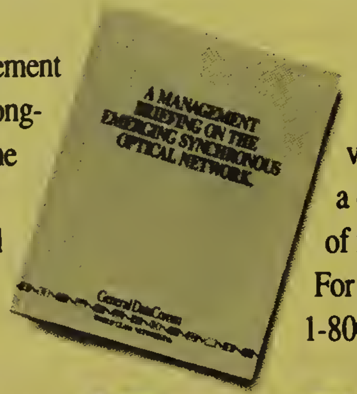
Over 7,000 Multiplexers Shipped

Circle Reader Service No. 22

SONET MANAGEMENT BRIEF

FREE SONET MANAGEMENT BRIEFING.

This important Management Briefing explores the long-term ramifications of the Synchronous Optical Network (SONET) and its potential impact on private networks.


A MANAGEMENT BRIEFING ON THE EMERGING SYNCHRONOUS OPTICAL NETWORK
General DataComm

This briefing compares the strategic value of T-3 versus SONET and provides a comprehensive overview of fiber optic standards. For your free copy, call 1-800-777-4005.

General DataComm

WORLD CLASS NETWORKING

CORPORATE / INTERNATIONAL HEADQUARTERS 203-574-1118 HONG KONG 852-833-6779 CANADA 416-498-5100
AUSTRALIA 61-2-956-5099 UNITED KINGDOM 44-734-774868 FRANCE 33-1-30570200 JAPAN 81-33-862-1730

Circle Reader Service No. 21

TCP/IP NETWORKING

TCP/IP for Windows 3.0

Enjoy the first TCP/IP package developed specifically (not converted from DOS) for Windows 3.0. It takes full advantage of Window's flexibility and multitasking capability, allowing multiple concurrent sessions with different accounts and hosts.

Newt TCP/IP Stack

- o TCP, UDP, IP, ICMP, and MAC
- o Berkeley 4.3BSD socket interface
- o Ethernet, Token Ring, FDDI, SLIP
- o NDIS network boards interface
- o Multiple concurrent TCP/IP applications
- o **Implemented as a DLL (not a TSR)**
- o Supports multiple boards simultaneously

$200

Newt-SDK

This software development kit offers the programmer direct access to the Transport, Network, and Datalink (MAC) layers.

- o Three DLLs included:
  - NEWT: TCP/IP stack
  - FTP: file transfer
  - SMTP: mail transfer
- o Requires no networking experience
- o Point and click user interface

Chameleon Applications

- o TELNET (VT100 emulation)
- o TFTP
- o PING
- o FTP
- o Statistics
- o SMTP
- o Custom
- o Mail
- o BIND

NETMANAGE overnight delivery: (408) 257-6404

NetManage Inc. 10020 N. DeAnza Blvd. #101, Cupertino, CA 95014, U.S.A. Fax: (408) 257-6405

All trademarks are property of their respective companies.

Circle Reader Service No. 9

SWITCHED 56

How to use Switched 56 for...

- Backing up DDS line
- Backing up critical T-1 channels
- Dial-up access to digital networks

Switched 56 has become a readily available and cost effective service. It offers simple, dial-up access to the growing world of digital networks. To access it, you need a Switched 56 "modem", a low cost device called a TIU (Terminal Interface Unit) or DU (Data Unit).

Dowty Communications makes these TIUs and DUs. The literature describing them includes explanations of six different applications with "how to" illustrations. There's also information on speed conversion (your input does not have to be 56 Kbps), automatic dialing and automatic switchover.

For more information on Switched 56 and on the Dowty DCP3058 TIU and DCP3060 DU, call 800-227-3134 or write Dowty Communications, Cherry Hill Industrial Center, Cherry Hill, New Jersey, 08003.

Dowty Communications
Formerly CASE/Datatel

DOWTY

Circle Reader Service No. 23

TESTERS

T1 monitoring in the palm of your hand.

- Unframed, SF and ESF formats
- Detect T1 errors and alarms
- Display DSO data and signaling bits
- Monitor audio on selected channel
- D3/D4, D1D and D2 compatible

Circle Reader Service No. 11

$795

Electrodata, Inc.
23020 Miles Road
Bedford Heights, Ohio 44128
Call Toll Free 1-800-441-6336
(216) 663-3333 TWX (810) 427-2280
FAX (216) 663-0507

Yes, I want $7,500 in free long distance service.

Quick, tell me more about *AT&T MEGACOM® WATS* in time to take advantage of your incredible "MEGA BUCKS" offer. Offer expires Sept. 2, 1991. Service must be installed by Nov. 1, 1991.

Return this coupon or call AT&T direct at:
1 800 247-1212, ext. 407.

Or *fax* this card to:
1 800 248-2492.

Name ____________________
Title ____________________
Company ____________________
Address ____________________
City ____________ State ______ Zip ______
Telephone (   ) ____________________
Current Long Distance Service ____________________
Monthly Spending $ ____________________

AT&T

© 1991 AT&T

NW701X

AT&T

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

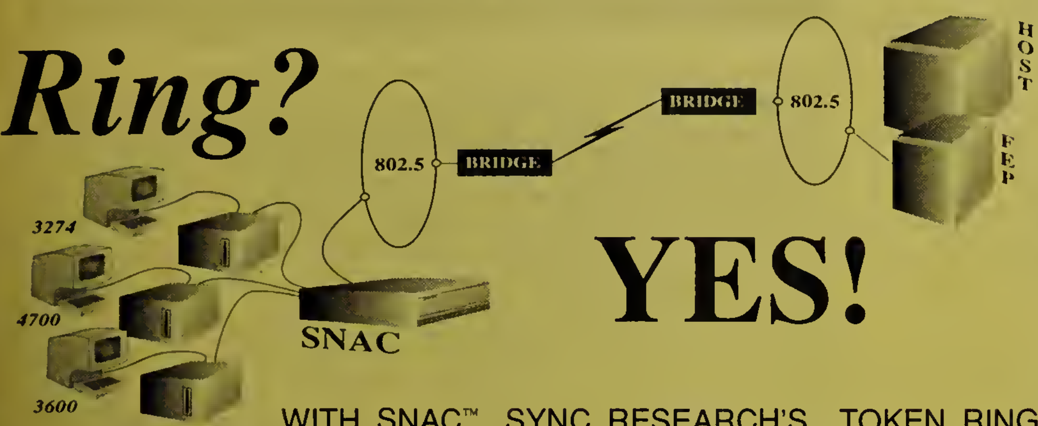
FIRST CLASS MAIL PERMIT NO. 150 JACKSONVILLE, FL

POSTAGE WILL BE PAID BY ADDRESSEE:

AT&T
PO BOX 45038
JACKSONVILLE FL 32232-9974

TOKEN RING CONVERTER

3274's On a Token Ring?



YES!

WITH SNAC™, SYNC RESEARCH'S TOKEN RING CONVERTER, YOU CAN CONNECT EXISTING "PRE-TOKEN RING" TERMINAL CONTROLLERS TO AN 802.5 TOKEN RING NETWORK.

- CONNECTS 3174S, 3274S, 4700S, 3600S AND OTHER PU2 CONTROLLERS TO TOKEN RINGS
- ELIMINATES MULTI-POINT SDLC LINES AND FRONT END PORTS

CALL 1•800•ASK SYNC for more information

SYNC RESEARCH

Circle Reader Service No. 12

VOICE/DATA COMMUNICATIONS

Four Positions In One.

That's what this AMP data connector offers. Along with being equivalent to IBM part number 8310574. And it's immediately available from Wise Components.

This IBM-qualified connector conforms to all specifications required for inclusion in IBM's local area network. Best of all, it provides easy, reliable wire termination without special tools.

AMP's four-position data connector features a multi-wire/multi-cable range, multi-cable exits/dual cable capability, ability to be re-terminated, snap-in panel mounting and self-latching.

Call now for a free brochure, so you can latch on to Wise's superior service.

Then you'll be in the best position.

Circle Reader Service No. 13

WISE COMPONENTS, INC.
800 543 4333

28 Henry Street
Greenwich, Conn. 06830
In Conn. 800 852 8557

AMP
Fax: 203 531 4859

VOICE COMPRESSION MULTIPLEXERS

STREAMLINE YOUR VOICE BANDWIDTH

And Integrate It With Fax and Data

The SDM-T Voice/Fax/Data Multiplexer—
Flexibility Where It Counts

Our SDM-T is more than just a voice compression multiplexer. It's also a bandwidth manager for real-time fax and data. We call it the FLEXIPLEXER because it can dynamically allocate bandwidth—for voice, fax or data—when and where it's needed.

And there's more—the SDM-T provides outstanding paybacks when used with 56 Kbps to 128 Kbps transmission circuits.

And still more—the voice quality is excellent and doesn't change with system loading. You can even use the same fax machine for both on-net and off-net applications.

*USE THE **FLEXIPLEXER** PLAN*
Call for a live demo and get more details on the most flexible multiplexer in the industry.
Call (800) FOR-ACT1 or (805) 527-2281

ACT
Advanced Compression Technology, Inc.

685 East Cochran Street
Simi Valley, CA 93065
(805) 527-2281
FAX: (805) 520-8099

Circle Reader Service No. 14

X.25 CONNECTIVITY

NO CARDS NEEDED!

Save money with X.25 Software Solutions from the PC Technologies Division at Microdyne

Introducing...
the pcX25 product line with TTY, VT52 and VT100 Async terminal emulation providing compatibility with host mainframe terminal support
and...
the snX25 product line with all the features of pcX25 plus 3270 terminal emulation for connectivity to IBM™, SNA and non-IBM™ hosts.

Microdyne

Circle Reader Service No. 15
Microdyne's PC Technologies Division
491 Oak Rd. • Ocala, Florida 32672
In U.S. (904) 687-4633 • TWX 810-858-0307 • FAX (904) 687-3392

Profits come from sales...

Sales come from leads...

Leads come from an ad in ActionCenter!!

Network World is the only publication that gives you weekly exposure for a month, directory-type pages, and bingo card response -- all for one cost-effective price!

Call today and generate leads and profits from your 300,000 impressions in Network World's Action Center.

Joan Bayon Pinsky
508-875-6400

Clare O'Brien
Pacific & Mountain Time
800-622-1108

NETWORKING MARKETPLACE

"FULL PERFORMANCE.. ..FRACTIONAL PRICE"

SCITEC IDM

Intelligent Digital Multiplexer

Features you would expect from a high-end T1 multiplexer...

- Modular architecture
- Hot-insertable cards
- Comprehensive diagnostics
- Intuitive user-interface
- Integral CSU
- Power supply redundancy
- CEPT compatible

...at a DSU/CSU price.

"An architecture to support your growing applications"

Ideally suited for image transfer, video-conferencing or LAN interconnection, the SCITEC IDM provides a cost-effective way to upgrade your network capability.

- 12 card slots - 8 DTE ports
- Trunk and port card options
- DACS/T1/FT1 compatible

"The effortless user-interface makes setup and maintenance a snap"

- VT100 and LCD interfaces
- Software configurable
- Remote unit configuration

Discover the SCITEC IDM, the cost effective solution to your network integration strategy.

SCITEC

Call Now...1-800-343-0928
Or Fax...1-401-849-8020

Scitec Communication Systems Limited • North America • Europe • Australia • Asia Pacific

BIDS & PROPOSALS

Sub-Bids Requested From Qualified MBE/DBE/WBE/SBE Subcontractors & Suppliers

State of California

Delivery, system testing and networking, maintenance of two UNIX data base servers with an option for additional servers
RFP TDC 91-01

Please respond by 7-8-91

520 Capitol Mall
Sacramento, CA 95814
(916) 326-5192
FAX: (916) 326-5877
Contact: D. R. Perrin

IBM®

AN EQUAL OPPORTUNITY EMPLOYER

Sub-Bids Requested From Qualified MBE/WBE/SDVE Subcontractors & Suppliers For State Of California

Installation Of Memory Cards In IBM AS400 Systems
DDS RFQ 8242

Must Respond By July 11, 1991

520 Capitol Mall
Sacramento, CA 95814
(916) 326-5192
FAX: (916) 326-5877
Contact: D. R. Perrin

IBM®

AN EQUAL OPPORTUNITY EMPLOYER

TRAINING

TELEtutor®

COMPUTER-BASED TRAINING

LAN
X.25
T1

FOR **FREE** CATALOG OF ALL OUR COURSES
CALL
1-800-542-2242
(603) 433-2242

INSTALLATION SERVICES

Computer Cabling Design and Installation

Specializing in Local Area Network Wiring Topologies

Networks Include:
Token Ring • Ethernet • Fiber Optic • UTP
Authorized Installers For:
IBM's COS • MOD-TAP • STAR-TEK
Lifetime Service Warranty

DATA CONNECTION
PROGRESSIVE COMMUNICATION INC

Nationwide Services
800 283-2821

DATA COMM

SELL OR TRADE YOUR SURPLUS
modems, mux's, data pbx, etc.

REPAIRS • UPGRADES • INSTALLATION • CABLING

MICOM. codex
paradyne AT&T
IBM Racal-Milgo
ARK CASE/Datatel
Universal Data Systems General DataComm

NEW AND USED EQUIPMENT BACKED BY WARRANTY
NATIONWIDE SERVICE MAINTENANCE AND INSTALLATION

we need to buy

- ***TIMEPLEX MULTIPLEXORS***
- ***UDS 208 AB MODEMS***
- ***CODEX 208 AB MODEMS***
- ***MICOM BOX 2 MUX'S***
- ***GDC MEGA SWITCH***

call us...

(201) 586-3070 FAX 586-3080

Warwick
DATA SYSTEMS, INC.

66 FORD ROAD, DENVILLE, NEW JERSEY 07834

Networking Marketplace

150,000 Buyers of Networking Products and Services are Within Your Reach!

The Networking Marketplace section of **Network World** is your most cost-effective advertising vehicle.

Network World is the only networking newsweekly that reaches 150,000 volume buyers every week.

Call: Joan Bayon Pinsky or Clare O'Brien
800-622-1108 or
508-875-6400,
today!

Interested In Advertising In Network World's Networking Marketplace?

We Have Sections For:

Telecommunications Equipment
Datacommunications Equipment, Bids & Proposals,
Computers, Consulting Services, Real Estate,
Seminars, Software, Training

Call Or Write: **Network World**

Joan Bayon Pinsky, 161 Worcester Rd,
Box 9172, Framingham, MA 01701-9172;
800-622-1108 (In MA 508-875-6400)
Pacific and Mountain time advertisers contact Clare O'Brien at above address and telephone.

NETWORKING CAREERS

Recruit the Best !

Network World is the #1 source for recruiting highly qualified networking and communications professionals. With over 150,000 direct subscribers, our readers turn to **Network World** every week to stay current on all areas of networking and communications technology.

So when you need to hire qualified networking and communications professionals, recruit the best in **Network World**!

To learn more about recruiting in **Network World**, call Bill Reinstein at 800-622-1108 (in MA 508-875-6400) today !

INDUSTRY LEADER
GULF COAST CAREER OPPORTUNITIES
SUPERVISORY AND STAFF POSITIONS

We are a growing **international maritime** and **trucking** services company supporting 63 offices, and 860 remote devices via 77 leased lines connected to an IBM AS/400 B60 and an IBM AS/400 D80. We service customers in the USA, Europe, Asia and South and Central America. An associates or bachelor degree is required.

EDI Programmer/Analyst - TDCC ANSI X.12 experience preferred. Hardware is not important. Knowledge of ACS translators and maritime, rail or trucking EDI a plus.

Applications Programmer/Analyst - Must be experienced in design and coding RPG III and RPG/400. Maritime, trucking, accounting or sales software and Synon/2E a plus.

Network Support - Experience needed in three of the following: X.25, domestic /international data leased lines, telex, VANS (Geisco, Tymnet, etc.), Synergy software or E-mail.

AS/400 Technical Support- Experience required in networking remote sites and devices. System tuning, performance tools and job accounting knowledge needed.

The Mobile Bay area supports a population of 500,000, and three universities. New Orleans is 2 1/2 hours west and gulf beaches are one hour south. Housing and taxes are one-half of the east and west coast.

Submit resume to Sereh Kelley, Admin. Assistant, MIS Dept., Southern Steem, Inc., P.O. Box 2965, Mobile, AL, 36652 or fax (205) 432-1089.

JEPPESEN SANDERSON
A TIMES MIRROR COMPANY

NETWORK APPLICATIONS PROGRAMMER ANALYST

Jeppesen Sanderson, the leading publisher of flight information and pilot training programs located in Denver, Colorado is adding a Network Applications Programmer Analyst.

Ideal candidate will have a B. S. Degree in Computer Science and five years of telecommunications programming and analysis in a VAX/VMS environment. Require network communications protocol coding experience. Familiarity with packet switching and PDN technologies, X.25. Ability to read and understand protocol specifications and write code to interface based on documented specifications. Ability to utilize datascopes and protocol analyzers.

Prefer knowledge of aviation oriented private networks such as SITA, ARINC, NADIN and AFTN. Familiarity with DECnet/ Ethernet networks.

We offer paid relocation, competitive salary/benefit package and an excellent work environment. Interested individuals please submit a resume and salary history in confidence to:

Jeppesen Sanderson, Inc.
Attn: Human Resources
55 Inverness Drive East
Englewood, CO 80112

55 INVERNESS DR. EAST ENGLEWOOD, CO. 80112

AN EQUAL OPPORTUNITY EMPLOYER M/F/V/H

Your Next Job May be On-line...

...On **Network World**'s new *Networking Careers On-Line* that is !

Networking Careers On-Line gives networking and communications job seekers a new way to learn more about career opportunities advertised in **Network World.**

This new, free service, available through **Network World's On-Line Bulletin Board System**, was designed to provide you with the information you need to keep abreast of current opportunities and make informed career decisions.

Here's what you'll see:

▲ The full text of an entire month's worth of **Networking Careers** employment opportunities.

▲ Additional valuable information to educate you about company corporate backgrounds and current needs.

▲ **The Networking Career Forum** where **Network World** readers share information and advice about career opportunities and employment-related subjects.

And, it's this easy to use:

▲ **Networking Careers On-Line** can be accessed 24-hours a day on the **Network World Bulletin Board System (BBS)**. From any computer and modem, simply dial ;

■ 508-620-1160 [300-2400 Baud (8-N-1)]
■ 508-620-1178 [to 9600 Baud (8-N-1)]
Networking Careers On-Line

ENGINEER

Exciting and challenging position available in beautiful Austin, Texas for motivated Engineer, to be filled at one of the following levels, depending on qualifications. Minimum qualifications are as follows: ENGINEERING ASSOCIATE II/III: Bachelor's degree in Electric Engineering plus two/four years experience in design, implementation, and maintenance of telecommunications systems. The successful candidate will design, implement and maintain telecommunications systems; participate in project planning and coordination, budgeting, and managing resources. Salary commensurate with qualifications.

Applications must be received in the Employment Office no later than 1:00 P.M. on FRIDAY, August 2, 1991. Submit to: City of Austin, Human Resources Department, Employment Office, 206 E. 9th, 14th Floor, P.O. Box 1088, Austin, TX 78767, ATTENTION: JOB ORDER #11010-0129EF

There's Still Time...

...To place your recruitment ad in the **Network World** special issue on July 15th which will reach thousands of additional readers at the Communications Networks West Conference and Exposition in San Francisco, CA. Don't miss this great opportunity to reach and recruit some of the most qualified and experienced networking and computer communications professionals in the country !

Space Reservation Close : Wed., July 3
Materials Close : Monday, July 8

Call Bill Reinstein today at (800) 622-1108 (in MA. 508-875-6400) for more information about our special recruitment advertising opportunity for this special issue.

NETWORKING RESOURCE DIRECTORY

Data Communications

Diagnostic Test Equipment

Analog Line Testers

GN Navtel	416-479-8090

Cable/Interface Testers

LAN Cable Testers

● Twisted Pair ● Coax ● Fiber ●

Cable Troubleshooting & Certification

- TDR, Length, Noise, Attn., XTALK, Line Map
- Fast, Easy, One Button "Auto Test"
- Automatic Printout of Test Results
- 10BASE–T, Token Ring, Ethernet, ARCNet, FDDI, and More

Outside California:
1-800-854-2708
Within California:
1-800-227-9781

Beckman Industrial™
An Affiliate of Emerson Electric Co

Glasgal Communications, Inc.	201-768-8082
GN Navtel	416-479-8090

Error-Rate Measurement Equipment

Glasgal Communications, Inc.	201-768-8082
GN Navtel	416-479-8090

Performance-Measurement Equipment

Glasgal Communications, Inc.	201-768-8082
GN Navtel	416-479-8090

Protocol Analyzers

Glasgal Communications, Inc.	201-768-8082
GN Navtel	416-479-8090

TEST YOUR NETWORK
WITH THE BEST

OUR PROTOCOL ANALYZERS

* Test Networks at Higher Speeds
* Are Easier to Use with EASY-VIEW™
* Are More Powerful and Flexible
* Test ISDN, T1, SS#7, SNA, X.25,...

TELENEX CORPORATION CALL 1-800-368-3261
AR Diagnostic Products

Protocol/Interface Simulators

GN Navtel	416-479-8090

T-Carrier

Electrodata, Inc.	800-441-6336
Glasgal Communications, Inc.	201-768-8082

DSU/CSU

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

Kentrox T1 CSUs - T-Smart ESF $1,995.
T-ServII $849. Config. & Diagnostic services.
Koenig Com. - T1 Specialists 800-786-9929

Modems

Limited Distance/Line Drivers

Equinox	800-275-3500
Glasgal Communications, Inc.	201-768-8082

High Speed (9.6kbps+)

Glasgal Communications, Inc.	201-768-8082

Fiber Optic

Canoga-Perkins Corp.	818-718-6300
Glasgal Communications, Inc.	201-768-8082

Multiplexers

Fractional T-1

AYDIN CONTROLS

MULTIPLEXERS
AND
4:1 and 2:1
DROP/INSERT TRANSCODERS

- Full and Fractional T1 Rates
- Toll Quality Voice High Speed Data
- Handles 9 6 Kbps Modem and Group III FAX

Call 1-800-366-8889
414 Commerce Drive • Fort Washington, Pa 19034-2602

Fractional T-1 cont.

Glasgal Communications, Inc.	201-768-8082

Optical Fiber

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

Statistical

Glasgal Communications, Inc.	201-768-8082

Time Division

Equinox	800-275-3500
Glasgal Communications, Inc.	201-768-8082

T-1

Anixter	800-232-0190
Canoga-Perkins Corp.	818-718-6300
Equinox	800-275-3500
Glasgal Communications, Inc.	201-768-8082

Network Management Systems

Glasgal Communications, Inc.	201-768-8082
Micro Technology	714-970-0300
Telenex-AR Prod.	800-368-3261
Telenex-Spectron Prod.	800-222-0187

Patching Equipment

Glasgal Communications, Inc.	201-768-8082
Telenex-AR Prod.	800-368-3261
Telenex-Spectron Prod.	800-222-0187

Switches

Data

Equinox	800-275-3500
Glasgal Communications, Inc.	201-768-8082
Wise Components Inc.	800-543-4333

Matrix

Equinox	800-275-3500
Glasgal Communications, Inc.	201-768-8082
Telenex	800-222-0187

Packet

Glasgal Communications, Inc.	201-768-8082
OST, Inc.	703-817-0400

Port Selectors

Equinox	800-275-3500
Glasgal Communications, Inc.	201-768-8082

Systems Integrators

Glasgal Communications, Inc.	201-768-8082

LAN UNIX X.25 SQL

SBT

StonyBrook Technologies, Inc.
(516) 567-6060 GSA Contractor
NOVELL MICROSOFT
DCA EICON EDA SCO
PRODUCT SUPPORT SERVICE

Terminal Servers

Equinox	800-275-3500
Glasgal Communications, Inc.	201-768-8082

Local Area Networks

Bridges

Anixter	800-232-0190
Canoga Perkins	818-718-6300
Glasgal Communications, Inc.	201-768-8082

Netronix.
The Second Generation Of Ethernet and Token Ring Bridges. 1-800-282-2535

Netronix
Technology That Works.

LAN/WAN Bridges

Glasgal Communications, Inc.	201-768-8082

Brouters

Glasgal Communications, Inc.	201-768-8082
RAD Data Communications Inc.	201-587-8822

Gateways

Glasgal Communications, Inc.	201-768-8082

Installation Services

Glasgal Communications, Inc.	201-768-8082

Local Area Networks

Broadband Based

Anixter	800-232-0190

Local Area Networks

ANIXTER.
Wiring Systems Specialists
Voice • Video • Data • Power

digital™
Authorized Distributor
800-232-0190

Glasgal Communications, Inc.	201-768-8082

Fiber Optic Based

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

Token Ring

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

10BaseT Systems

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

CALL THE
CONNECTIVITY EXPERTS

- David Systems
- Startek
- Allied Telesis
- Network Application Technology
- Proteon
- DAMAC
- Others

Westech Communications, Inc
28310 Industrial Blvd, Suite K
Hayward, CA 94545 (415)887-8773

LAN Test/Management Devices

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

Routers

Glasgal Communications, Inc.	201-768-8082

Security

Dial Back Systems

Equinox	800-275-3500
Glasgal Communications, Inc.	201-768-8082

Software

Cable Management

Glasgal Communications, Inc.	201-768-8082

EMail/Messaging

Notework Corporation	800-767-6683

E-Mail Gateways for Macintosh
StarNine Technologies (415) 548-0391
2126 6th St. Berkeley, CA 94710

Micro-to-Mainframe

StonyBrook Technologies, Inc.	516-567-6060

Network Management

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

NetAlarm NetWare Monitor TSR
"Smoke Detector" for NetWare
Meyer & Associates 415/277-1975

Objective Systems Integrators	916-989-7340

Structured Wiring Systems

Baluns

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

TIEX
TWISTED-PAIR WIRING SPECIALISTS
for
IBM AS/400, S/3X, TOKEN RING, 3270 + + +
800-533-TIEX
fax 214-385-0723

Cables

Coax

Anixter	800-232-0190

Coax cont.

Glasgal Communications, Inc.	201-768-8082

Fiber Optic

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

Twisted Pair

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

Connectors

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

MOD-TAP.
Total Wiring Solutions
from
YANKEE
1-800-365-9720 FAX: 603-625-4915

Cross Connect Blocks

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

Wiring Concentrators

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

Support Equipment

Power Distribution/ Equipment Protection

UPS Supplies

EXIDE ELECTRONICS
5608 Spring Court, Raleigh, NC 27690-0457
800-554-3448 fax: 800-75-EXIDE

Support Services

Consulting

General Network Service Inc	203-327-2322

MULTI-TECH COMMUNICATIONS, INC.
VOICE * DATA * LAN
CALL 201-627-2518

NOVELL SERVICE
SUPPORT & CONSULTING
(408) 559-7367

Educational Training Services

IBM: SNA/APPC/CPI-C

Galaxy Consultants	408-354-2997

Lease/Resale Organization

Marketex-Leasing Services	408-241-3677

Telecommunications/ Voice

Fax Processing Systems

Fax with FAX-LINK
Easily fax WP, PO's, Quotes, Etc. from any terminal
PHONE: 409-762-2886 Intuitive Technology Inc FAX: 409-765-7073

ISDN Products

Anixter	800-232-0190
Glasgal Communications, Inc.	201-768-8082

Transmission Services

International

World Communications, Inc.	212-607-2223

Microwave

FCC Licensed Digital Microwave
Carrier • Bypass • Alternate Access
• Disaster Recovery/Diversity

(212) 509-5115 LOCATE
17 Battery Place, Suite 1200, NY, NY 10004

T-1

Glasgal Communications, Inc.	201-768-8082

VSAT

GTE Spacenet Corporation	800-535-5375

International VANs

World Communications, Inc.	212-607-2223

Ford lets suppliers tap in

continued from page 1

thin and suppliers deliver parts right to the assembly line.

The program makes it much easier and less costly for Ford and its 1,500 suppliers to identify and respond to shortages of parts on a daily, even hourly, basis, according to Craig Tyrrell, section supervisor of distribution and performance in the body and assembly division at Ford.

Using a personal computer and modem, suppliers dial into MS III early each day to check stock levels of their parts at Ford's 17 North American assembly plants. If a shortage is identified, they take action to fill the order (see graphic, page 1).

Previously, Ford assumed the burden for identifying impending shortages and notifying suppliers. This was done in Ford's central distribution office here by about 95 staffers who checked MS III each day and called suppliers and assembly plants if they spotted shortages.

"Basically, we functioned as a middleman adding little value to the process," Tyrrell said. "Now all we do is provide [access to] the information and the supplier is responsible for identifying shortages and figuring out how to take care of them."

The new system will enable Ford to reduce the number of positions in its central distribution office here by about two-thirds, from 95 to 35, when all suppliers come on-line, sometime around 1995, Tyrrell said.

Humble beginnings

The DDL program began in 1988 when Ford's internal suppliers — Ford divisions that make auto components such as engines, windshield glass and climate control systems — asked to be linked to MS III so they could better plan their daily production runs and shipment schedules.

The move was so successful that Ford decided to extend the program to all suppliers, Tyrrell said. To minimize the security risks, Ford developed a number of measures to prevent outsiders from gaining unauthorized access to Ford's other internal systems (see "Security is top concern," this page).

While the security provisions can be frustrating, suppliers have wholeheartedly supported DDL, Tyrrell said. Currently, there are 84 suppliers participating in the program, with many of the remaining 1,500 eager to sign up.

DDL enables suppliers to better manage their production runs, inventory and shipment schedules, which translates into tangible savings for both Ford and its suppliers, he said.

Under the old system, suppliers often would not be notified of shortages until late in the morning, forcing them to interrupt production runs to make additional parts and expedite the shipment by using more expensive forms of transportation, such as chartered air flights.

These last-minute changes might have cost Ford or the supplier — depending upon who was responsible for the shortage — several thousand dollars.

One Ford supplier, O'Sullivan Corp., a maker of car interior trim parts, used to charter flights to deliver parts once or twice a month. Since it started using DDL last year, it has yet to make an air charter shipment, according to Keith Kavel, electronic data interchange manager at O'Sullivan in Winchester, Va.

> "DDL lets us control our own destiny," Kavel said. "Saving one chartered air flight more than pays for the program."
>
> ▲▲▲

"[DDL] lets us control our own destiny," Kavel said. "Saving one chartered air flight more than pays for the program."

Besides identifying shortages, the on-line system lets suppliers define packaging specifications, reconcile receipts for shipments, review daily and weekly material releases, check requirements for future shipments and obtain information about new product launches and plant schedules.

Suppliers are also developing software programs to take advantage of the wealth of data that DDL makes available to them. One large supplier has developed a program that extracts data from MS III to help it plan inventory levels and production cycles.

"[DDL] makes Ford much easier to do business with," Tyrrell said. "We believe it gives us a significant competitive advantage."

Supplement for EDI

According to Tyrrell, the DDL program supplements EDI instead of replacing it. EDI provides suppliers with the data they need to plan inventory levels and production cycles on a weekly, monthly and quarterly basis.

Currently, Ford uses EDI to send suppliers a daily ship schedule, which tells them what to deliver and how to ship it each day for the following five days. It also sends a weekly notice that tells suppliers how many parts to produce each week for the upcoming three months. And it sends estimates on the number of vehicles Ford plans to produce for the following six months.

"As long as suppliers adhere to schedules sent via EDI and nothing goes wrong, EDI is sufficient," Tyrrell said.

But problems always crop up that affect stock levels, he added.

Supplier machinery can break, a key manager can quit and stock can be defective, lost or damaged in transit. To keep assembly lines from shutting down, suppliers often must reship parts within a matter of hours.

With DDL, suppliers usually catch potential problems and take steps to avert a shortage long before Ford becomes aware of the situation, Tyrrell said. "DDL lets us move away from a culture in which we react to events," he said. "Now we're more proactive and better partners."

Security is top concern

DEARBORN, Mich. — Despite potential benefits, many companies are reluctant to let suppliers access data on their internal systems because of security risks.

Ford Motor Co. established a multilayered security architecture when it decided to give suppliers direct access to its central material control and inventory system here. The on-line system, dubbed Direct Data Link (DDL), lets suppliers check stock levels of their parts at Ford's 17 assembly plants in North America.

The DDL program has multiple levels of system security.

The first security level is supplied by BT North America, Inc.'s Tymnet value-added network. Suppliers must log on to Tymnet using an authorized identification and password before they can access Material System (MS) III.

Then suppliers must provide an authorized identification and password in order to access Ford's internal systems.

Suppliers are prevented from accessing all applications on the systems except for MS III.

In order to access MS III, suppliers must provide a second identification and password. They see only those fields and records pertaining to parts they are under contract to ship.

In addition, the system restricts suppliers from accessing records that contain supplier performance evaluations and price agreements.

Despite the security measures, Ford suppliers have a window into the automaker's internal systems that suppliers for other carmakers don't enjoy.

— *Wayne Eckerson*

Agency's vision takes shape

continued from page 4

him to first experiment by running small pilot LANs until there was a higher comfort level with the technology. He resisted moving to a costly mid-range system as an alternative since he was convinced LAN technology could meet his needs.

"I would not compromise," Tafoya said. "In terms of technology, the whole state is nothing but Band-Aids on top of Band-Aids. The cost for that type of approach is too high."

During that time, CDVA limped along with ancient Four Phase computers that Tafoya said were falling apart and occasionally need to be patched together by having spare parts made at a machine shop.

Since he could not proceed with his LAN plans, and the Four Phase computers were on the way out, Tafoya installed hundreds of stand-alone personal computers to take up the slack.

He said the state's money was wasted unnecessarily on stand-alone printers, printer switch boxes and 3270 communications boards that would not have been needed if the LANs had been approved earlier. But year after year, the battle was the same — more reports and more justifications, and then more waiting.

As a result, when Tafoya speaks of the maneuvers required to implement the agencywide network, it's as if he is mobilizing a tactical military operation. LAN installations are now ready to "roll out to the field." Software developers and trainers are grouped into "SWAT teams."

"While we were waiting, we had a lot of time for fire drills," Tafoya said. "Now that we have the final approval, our plans and preparation are allowing us to move at top speed."

The new network will utilize Compaq Computer Corp. System Pro computers as file servers running Novell, Inc.'s NetWare 386 with leased-line links from CDVA headquarters to LANs in the district offices. The Sacramento site will also be linked to the state's Teale Data Center for nightly updates of the mainframe. Eventually, the network will support some 750 personal computers.

The impetus to install the LANs stemmed from the desire to support a new application being developed internally using Information Builder, Inc.'s FOCUS data base. Dubbed The Contract Information Input System, this application will manage the home loan data of the CAL VET program.

Since the old loan processing system required paper documents to be submitted to a central location for input by data entry operators, one of the key time-saving benefits of the new system will be to allow users in the field to enter transactions themselves. This will give district supervisors greater control over the loan application process and cut processing time in half.

A prototype of the new data base could be ready in as early as six months, and Tafoya plans to have the entire CAL VET application implemented across the network by the end of 1992.

In the meantime, by adding support for Microsoft Corp.'s Windows to the LANs, users will at least have the added benefit of being able to view data from several areas simultaneously. Software plans also include the design of another data base in FOCUS for the Vet Services' programs, which primarily handle veterans' ongoing claims.

When the new data base is implemented, CDVA will be able to save money by reducing mainframe time-sharing costs from current on-line use to nightly batch updates. With more than 20 developers working on personal computers, Tafoya claims to have already saved $400,000 just last year by moving development off the mainframe.

Voice processing guide helpful

continued from page 19

ers understand the technology and sort out the myriad products and providers in the voice processing marketplace. The book provides a straightforward overview of voice processing that would benefit both newcomers and veterans of the technology.

Voice processing, as Tetschner defines it, focuses on "utilizing speech technology to facilitate the dissemination and retrieval of information." The book explores the underlying technology of voice digitization and the resultant products, such as voice mail, automatic dialers and service bureau offerings such as 900 numbers. It also discusses the status of leading-edge voice processing technologies, such as text-to-speech and speech-to-text applications.

A particularly useful section involves the 19 appendixes, which list a veritable Who's Who in the field of voice processing products and services. The appendixes list the names, addresses and phone numbers of voice processing manufacturers and service providers, and describe the types of products and services each company offers. The book also offers a section on how to cost-justify the purchase of voice processing systems.

For a truly comprehensive, meat-and-potatoes review of voice processing, it's difficult to find a better text. You can order it directly from the publisher by calling (800) 225-9977, Ext. 4002.

AIA to test standard for EDI over X.400

The Aerospace Industry Association (AIA) will soon begin examining the feasibility of using the CCITT X.435 standard for EDI over X.400 to exchange compound documents.

The AIA test comes in response to federal government initiatives calling for major contractors to be able to interact with the government by electronically transmitting business documents and technical files, such as computer-aided design drawings, instead of mailing in paper documents.

Seven aerospace companies have agreed to fund the project, including The Boeing Co., Lockheed Corp. and Martin Marietta Corp., as well as several carriers, such as AT&T and British Telecommunications PLC.

According to Rick Saddic, project leader for the AIA and a senior program leader at Westinghouse Electric Co. in Baltimore, the test will compare two methods for sending compound documents. One method uses the X.435 standard (see "Users applaud passage of EDI-over-X.400 standard," page 4) and the other uses the ANSI X12 841 message set, which has a segment for binary files.

Saddic said the test, scheduled to run during the 1991-1992 time frame, will determine which standard does the best job of cross-referencing multiple documents in a compound document file. Cross-referencing is necessary to keep track of associated documents that have been routed to different applications.

— *Wayne Eckerson*

Users applaud standard

continued from page 4

sages from X.400 nets into EDI applications, he said.

The PO protocol, which has been recommended for EDI-over-X.400 transmissions by the National Institute of Standards and Technology (NIST), doesn't identify the content of the message. Like the P2 protocol, users cannot be certain which messages contain electronic mail and which contain EDI documents until they open up the envelope — a time- and resource-consuming process. As a result, users have to attach special identifiers to each message to distinguish the contents or establish separate networks for EDI and E-mail.

But users say supporting dual gateways is redundant and a waste of resources. "Why should we have to support separate gateways for EDI and messaging when they essentially perform the same function?" said Sandy Whitson, EDI manager at Hewlett-Packard Co. in Palo Alto, Calif. "X.435 will let us consolidate our nets and have a single point of entry into the company."

The envelope for X.435 specifies that the message contains an EDI document, allowing companies to quickly identify and route incoming messages to mailboxes or EDI applications.

In addition, the X.435 header gives users additional information about the document or documents inside the envelope, such as the name and address of the sender and the translation software used. This will allow users to sort messages before processing them.

The standard will also let users attach other so-called body parts to the message, which might contain such things as computer-aided design drawings, text files, spreadsheets and encrypted data. The standard enables users to cross-reference these body parts with the original EDI document. This enables users to route the body parts or documents to different people or applications within the company without losing track of which documents belong together.

Boeing's Schachter said he is paying close attention to the agreements software developers are making in the OSI Implementors Workshop sponsored by NIST. The workshops are designed to promote interoperability by getting vendors and users to define exactly how they will implement standards.

"So far, the workshop is heading in the right direction, choosing options that will provide users with the greatest amount of features," Schachter said.

Most users interested in X.435 are big companies with well established EDI programs and X.400 networks, such as DEC, HP and TI. Many aerospace firms, such as Boeing, are interested in X.435 because the federal government is putting pressure on its major contractors to communicate electronically (see "AIA to test standard for EDI over X.400," this page).

To implement X.435, users first need to build an X.400 network, an expensive proposition. Moreover, to get the full functionality out of the standard, users will have to implement the 1988 version of X.400, which doesn't yet exist as commercial software. That will mean an expensive upgrade in the near future.

"X.435 will initially be a rich man's game," TI's Payne said. ◘

Novell drafts LAN blueprint

continued from page 1

ment systems, such as IBM's host-based NetView.

"We do not intend to be a manager of managers; we're not going to manage voice nets or PBXs," said Bernard Harguindeguy, product line manager at Novell's Communications Services Division in Sunnyvale, Calif. "We're going to manage NetWare."

Novell also stressed that products based on the net control strategy will support industry standard management protocols, such as the Simple Network Management Protocol, Common Management Information Protocol and Common Management Information Services, as well as the Heterogeneous LAN Management protocol developed by IBM and 3Com Corp.

In addition, Novell said it will offer the management console, net control applications and application programming interfaces (API) to let third-party developers write management applications.

Five-point strategy

Novell said its network management strategy specifies a management console; management information services platform, which is a server-based engine that pools data from devices on the net and sends it to the management console; management applications, which reside on and manage specific nodes; managed resources, or hardware and applications in the network; and enterprise management interoperability, which provides hooks to integrated net management systems.

Although Novell declined to identify it, most analysts expect the management console application to act as a front-end graphical user interface running on an Intel Corp. 80386-based computer.

According to Novell, the console software initially will run under Microsoft Corp. Windows 3.0 and IBM OS/2 Presentation Manager.

The console will provide a map of objects — including hardware and software sessions — on the network.

A Novell white paper on the strategy stated, "A system administrator [will be able to] identify managed resources on the network and — depending on which other management applications are resident — monitor, troubleshoot and configure those resources."

The management console will interact with the management information services platform, which culls data from Novell and third-party management applications and passes it to the console.

Novell said applications written to its net management specifications will be able to manage applications; protocols; internetwork devices; hardware, such as servers and workstations; wiring; and the logical network, such as the node-to-node connections. According to Harguindeguy, Novell will manage these different components through management agents built into NetWare.

For the past two years Novell has included a management agent in NetWare 386 and more recently, NetWare 3.11. This management agent, he said, is software in a management application that feeds event data collected by the application to a management information services platform.

Agents may reside in management applications monitoring any node on the net, not just server nodes. Third parties can then develop management applications that send information to the Novell management information services platform by including this agent code in their products.

Finally, Novell will build upon its current interoperability capabilities by providing similar hooks to other enterprise managers from such companies as AT&T, Digital Equipment Corp. and Hewlett-Packard Co.

At the briefing, Harguindeguy demonstrated a prototype of a file services management application that Novell is currently developing.

The application automatically discovers all devices on the net and generates a map. Once the network map appears on the screen, the administrator can zoom in on a particular area of the network according to either the node address or the cable segment. ◘

MCI users to form group

continued from page 2

tee. "I think we have a good chance of better understanding one another's needs."

Dick Bradner, manager of network/office services at The Progressive Companies, a Cleveland-based insurance provider, said the user group will enable MCI customers to help set telecommunications policy direction in the U.S. by having greater influence on the nation's second-largest carrier.

"It was exciting to find out during the steering committee meetings that there are other users in the MCI world with similar concerns," said Bradner, a member of the steering committee. "MCI can expect to get some novel and candid direction from us on issues such as billing and 800 number portability."

Carl Thomsen, senior manager of large accounts marketing for MCI in McLean, Va., said the group will give customers a better idea of MCI's future direction, enable them to share application ideas and experiences, and give the company their input.

The MCI Users Network

Current steering committee:
A.G. Edwards & Son, Inc.
American Express Co.
ARA Services, Inc.
Bechtel Power Corp.
Brown Group, Inc.
Digital Equipment Corp.
Harris Corp.
Limited Credit Services
The Progressive Companies
SunTrust Service Corp.
Time Warner, Inc.
Woolworth Corp.

SOURCE: MCI COMMUNICATIONS CORP., WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENEY

MCI is the last of the Big Three carriers to form a user group.

According to Woolworth's Johnson, the topics of discussion at the upcoming meeting will include net management, virtual networks and disaster recovery.

The group is mainly being funded by the users, and it plans to operate independently of MCI once it gets rolling. "We don't want this to be just another marketing avenue for MCI," Johnson said. ◘

NETWORK WORLD
▲▲▲
161 Worcester Road
Framingham, Mass. 01701-9172
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: $5.00 a copy; U.S. — $95 a year; Canada, Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by Network World, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus 50 cents per page is paid to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

POSTMASTER: Send Change of Address to *Network World*, 161 Worcester Road, Framingham, Mass. 01701-9172.

Copyright 1991 by Network World, Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.

The Audit Bureau

Reprints (minimum 500 copies) and permission to reprint may be purchased from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

Lotus deal ups IBM's vision

continued from page 1

the formal press briefing but was mentioned in subsequent analyst briefings and press interviews (see "IBM refocuses office tool," this page).

IBM said Notes will be complementary to, but not integrated with, OfficeVision/2 LAN. Notes will add the ability to let users form logical work groups, regardless of location, whose members can share data bases and files. IBM will not merge the two products per se, but users will be able to access them, plus cc:Mail, from the same graphical interface.

There is some overlap in functions of OfficeVision/2 LAN, Notes and cc:Mail, but IBM officials said the products address different user requirements.

According to Tony Mondello, programming systems director of office systems development for IBM, cc:Mail is an entry-level LAN E-mail system that supports numerous clients, including Apple Computer, Inc. Macintosh and DOS workstations, as well as Microsoft Corp.'s Windows. It costs only $50 to $75 per user and has gateways to IBM mainframe-based E-mail systems.

Mondello said IBM will cease marketing Microsoft's Network Courier E-mail package.

As users need more functionality, they can turn to either Notes or OfficeVision/2 LAN.

With Notes, users working on the same project, for example, can create a common data base which will be replicated on each user's local server, said Dick Anderson, office systems director for IBM U.S. Changes to any of the data bases are replicated across the others. Therefore, multiple copies of the same data base may exist, although they may not always be in perfect synchronization, he explained.

That is suitable for many business applications, he said, but not for applications such as claims processing or payroll, where the integrity of data is crucial. IBM addresses that need with the distributed data base capabilities of OfficeVision/2 LAN and the other MVS, VM and OS/400 versions of OfficeVision, Anderson said.

A missing link

The OfficeVision products also promise to let users seamlessly tie OS/2-based LANs into an enterprise network that includes mainframes and Application System/400 mid-range computers.

But one piece was missing.

"The fact is, we really didn't have anything in our plan for a work group collaboration product," Anderson said. Currently, IBM has no plan to offer Notes on an operating system other than OS/2, he said.

Having IBM's sales force behind it should mean a big boost for Notes, according to Michael Anderson, program director in office information systems for Gartner Group, Inc., a research and consulting company. He said IBM should also get integration services business since Notes often requires customization.

The deal could also bolster OS/2. IBM and Lotus will work jointly to enable portions of Notes and OfficeVision/2 LAN to run on the new 32-bit OS/2 2.0 operating system IBM is scheduled to ship later this year.

OS/2 2.0 will include an enhanced graphical interface, dubbed the Workplace Shell, that Notes, OfficeVision/2 LAN and cc:Mail will support.

A common directory function and E-mail engine, which is the portion of a messaging application that handles the transfer of packets from one point to another, will also be included in OS/2 2.0, IBM's Anderson said.

Sensible strategy

Keith Sievers, treasurer and vice-president of information systems for Federal Kemper Insurance Co. in Decatur, Ill., is an OfficeVision user who thinks that strategy makes sense.

"[Mail and directory] functions can be used by a number of different applications," he said. "To replicate them in every application doesn't make sense. It makes more sense to do it once under OS/2, then let all the applications use those functions."

IBM and Lotus will also include Notes' communications and data base replication capabilities in OS/2 2.0, according to Larry Moore, vice-president and general manager of Lotus' communications products division.

"Customers, [independent software vendors] and corporate developers will be able to create communicating applications much easier — like an order of magnitude easier — than they ever could before," Moore said.

Also to be incorporated into OS/2 will be Notes server software and client application program interfaces, Moore said. "Taken together, they will allow people to construct their own client/server applications that run over a LAN, over a wide-area network and potentially to disconnected laptop users," he said.

The two companies did not disclose when the new OS/2 features would be delivered but said more details would be released in coming months.

Moore said the OS/2 developments will not diminish Lotus' commitment to support Windows, Macintosh and Unix environments within Notes. He said IBM would be privy to forthcoming Notes products for Unix. ◻

IBM refocuses office tool

NEW YORK — IBM last week said some features originally scheduled to ship in OfficeVision/2 LAN will be bundled into the current release of the product, while others will be either integrated into OS/2 or delayed indefinitely.

IBM announced — and is now shipping in OfficeVision/2 LAN 1.1.1 — support for OS/2 Extended Edition 1.3 and IBM OS/2 LAN Server 1.3, said Mike Early, manager of office system market planning at IBM.

OfficeVision/2 LAN 1.1.1 also now supports Personal Application System (AS), an OS/2-based decision support system.

IBM's Workplace Shell, an enhanced graphical user interface, is being lifted from OfficeVision/2 LAN to be included in OS/2 2.0, Early said. The shell offers the capability to trigger processes by dragging and dropping icons on the desktop, such as dropping a file into an electronic wastebasket. Porting that feature to the operating system will let any application take advantage of the interface, he said.

IBM also announced a number of other OfficeVision/2 LAN enhancements, which will be the last enhancements to Version 1 of the software. That package runs under the 16-bit version of OS/2. Future enhancements will be developed to take advantage of the added memory, speed and functions of the 32-bit OS/2 2.0 due out later this year, Early said.

Among this last group of Version 1 enhancements, which are scheduled to ship in December, is support for OfficeVision/2 LAN on Novell, Inc. NetWare 286 and 386 local-area network operating systems and for Microsoft Corp. Windows clients.

IBM also said OS/2 2.0 will be able to run any OfficeVision/2 LAN application written for the 16-bit versions of OS/2.

Last week was not the first time IBM has announced that features originally scheduled for OfficeVision/2 Release 2 would ship in existing versions.

It appears now that Release 2 will never exist as IBM originally intended, though all the functions promised will ship in either Release 1, as part of OS/2 2.0, or in an entirely new version of OfficeVision/2 LAN based on the 32-bit OS/2 2.0.

Among the functions that will not ship until that later version is the ability for an OS/2 client to directly connect to a mainframe, Early said. Today, clients can only communicate with hosts via 3270 terminal emulation.

— *Paul Desmond*

IBM gets more aggressive

continued from page 4

ware firms began in earnest about 18 months ago when the vendor decided to "become less SNA and more open" to meet customers' multivendor network needs.

The pace of alliance announcements since then has been brisk and "will continue nonstop for the rest of the year," he said.

The main reason, observers agreed, is that IBM needs to move more quickly in satisfying customers to maintain control of its important accounts.

"If IBM is to retain some semblance of account control, it needs to be viewed as a solutions provider," offering its own computers and network gear bundled with other vendors' offerings, said David Passmore, a partner at Ernst & Young, a Fairfax, Va., consultancy.

According to Jim Oleksiw, telecommunications director in The Travelers Corp.'s network engineering group, "It reflects the fact that IBM needs to get products to market faster. They don't have it all in-house, and certain companies can develop products faster."

Guy Hoffman, a vice-president at Eicon Technology, Inc., a manufacturer of Systems Network Architecture and Open Systems Interconnection gateways and bridges, said IBM has been forced to partner with others because users "are seeking immediate gratification.

IBM conceded that it couldn't meet users' LAN needs fast enough on its own when it began selling NetWare, Hoffman said.

"IBM saw it was losing the LAN business, and without the LAN business, it would have difficulty keeping control over accounts it needs to sell the big iron," he said.

In addition, the alliances position IBM more firmly as a provider of systems integration and network support services, Passmore said. That's important because profit margins on equipment are shrinking, while those for services and support remain high.

Part of IBM's alliance strategy may even be to tie up key players in the network market, such as Novell, to keep them from teaming with others, said Bob Segal, a principal at Frank Lynn & Associates, Inc., a consulting firm in Chicago.

Overall, users are pleased with IBM's alliances.

Burt Treger, network planning manager at IBM customer SunTrust Service Corp. in Atlanta, said he is encouraged by IBM's efforts to become a one-stop shop for computers and network gear. But he warned that alliances can create confusion among account representatives, who already have difficulty keeping up with IBM's own vast array of products and services. ◻

Network World Advertising Sales Offices

BOSTON
Donna Pomponi, District Manager
Eleni Brisbois, Sales Assistant
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 651-1853

NEW YORK
Paul Bonington, District Manager
Marlene Levis, Sales Assistant
365 W. Passaic St., Rochelle Park, N.J. 07662
(201) 587-0090/FAX: (201) 712-9786

NEW JERSEY/PHILADELPHIA/D.C.
Joan Daly, Eastern Regional Manager
Marlene Levis, Sales Assistant
365 W. Passaic St., Rochelle Park, N.J. 07662
(201) 587-0090/FAX: (201) 712-9786

CHICAGO
Don F. Mahlmeister, National Sales Manager
Dan Gentile, District Manager
Kathy Mazzie, Sales Assistant
10400 West Higgins Rd., Suite 300
Rosemont, Ill. 60018
(708) 297-8855/FAX: (708) 827-9159

SAN FRANCISCO
Chris Curry, Western Regional Manager
Sandra Kupiec, District Manager
Lonnie Forbes, Sales Assistant
Beverly Davis, Sales Assistant
2083 Landings Drive, Mountain View, Calif. 94043
(415) 691-0510/FAX: (415) 691-0525

ATLANTA
Don Seay, District Manager
Annette Johnson, Sales Assistant
1400 Lake Hearn Dr., Suite 330, Atlanta, Ga 30319
(404) 394-7509/FAX: (404) 255-5123

LOS ANGELES
Dana McCarron, District Manager
Karen Silverstein, Sales Assistant
18008 Sky Park Cir., Suite 145, Irvine, Calif. 92714
(714) 250-3006/FAX: (714) 250-4881

RESPONSE CARD DECKS
ACTION CENTER
PRODUCT CLASSIFIED ADVERTISING
RESOURCE DIRECTORY
Joan Bayon Pinsky, Sales Director
Clare O'Brien, Account Executive Western Region
Eleni Brisbois, Sales Assistant
161 Worcester Road, Framingham, Mass. 01701
(508) 875-6400/FAX: (508) 651-1853

RECRUITMENT ADVERTISING
William Reinstein, National Sales Director
Pam Valentinas, District Manager
Christie Sears, Sales Assistant
(508) 875-6400

ADVERTISING OPERATIONS
George Griffin - Advertising Operations Manager
Karen Wallace - National Account Supervisor
Linda Miller - W. Region Account Coor.
Barbara Hill - Classified Account Supervisor
(508) 875-6400

Network World, Inc.
An IDG Company
Network World Headquarters:
161 Worcester Road, Framingham, Mass. 01701
Phone: (508) 875-6400/FAX: (508) 879-3167

Gary Beach - President
Mary Fanning - Dir. of Financial Operations
Nanci Farquharson - Adm. Assistant
(508) 875-6400

MARKETING
Evilee Thibeault - Director of Marketing
Carol A. Leonard - Marketing Comm. Specialist
(508) 875-6400

RESEARCH
Ann MacKay - Research Manager
(508) 875-6400

CIRCULATION
Richard Priante - Director of Circulation
Renee Visconti - Fulfillment Manager
Jim Pernock - Customer Service Rep.
(508) 875-6400

PRODUCTION
Ann Finn - Production Director
Cheryl Rothman - Production Coordinator
Anne Rosenkranz - Imaging Manager
(508) 875-6400/FAX: (508) 875-3090

REPRINTS
Donna Kirkey - Reprint Coor./Graphic Designer
(508) 875-6400

LIST RENTAL SERVICES
Loel Westermann - List Rental Sales
P.O. Box 9151, Framingham, MA 01701-9151
(508) 879-0700

INFORMATION SERVICES
Jeff Pennett - Director of Info. Services
Jack McDonough - Mgr. of Info. Services
(508) 875-6400

DISTRIBUTION
Bob Wescott - Distribution Manager
(508) 879-0700

IDG
Patrick J. McGovern - Board Chairman
Walter Boyd - President
William R. Murphy - Vice-President Finance

Network World is a publication of IDG, the world's largest publisher of computer-related information. IDG publishes over 130 computer publications in more than 40 countries. Nineteen million people read one or more IDG publications each month. IDG contributes to the IDG News Service offering the latest on domestic and international computer news.

All the luxury of a digital service now available with a meter.

For you, a dedicated digital service might well seem over the top.

After all, your transmission volume won't justify the cost of an exclusive telecommunications route to the U.S.A.

Which is exactly why AT&T Bell Laboratories designed AT&T Switched Digital International Service as dial-up, available on demand and usage sensitive.

You only pay for the point-to-point digital link when you actually use it. And that opens up a whole world of applications possibilities, from Business Video, Group IV Fax and CAD/CAM to Back-Up and Electronic Data Transfer.

It also opens up any number of different point-to-point connections without the need to manage multiple private lines. Thus optimizing your network at minimum cost.

All we ask is that your fare at the end of the month come to at least $75.*

Which, for an idea as simple as a meter, should certainly set your mind ticking about what else we can do for you.

Specify AT&T to your local telecommunications company for all your satellite, terrestrial, switched and private leased telecommunications with the U.S.A.

For more information, please contact your local AT&T office.

The right choice to the U.S.A.

AT&T

*Access charges not included.

©1991 AT&T